The Design and Evaluation of a Multimedia Application for Second Language Listening Comprehension.

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For Alice

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List of publications arising from this thesis.

This is a list of the refereed academic publications which have appeared during the preparation of this thesis. Copies of each are included in Appendix O. These are included in accordance with University of Wolverhampton's Regulations for the award of Degrees of Doctor of Philosophy 7.6 (1998).

Brett, P.A. (1995) Multimedia for listening comprehension:- The design of a multimedia-based resource for developing listening skills. *System,* 23(1) pp. 77-86.

Brett, P.A. (1996) Using multimedia:- an investigation of learners' attitudes. *Computer Assisted Language Learning Journal,* 9(2), pp. 191-212.

Brett, P. A. (1997) A comparative study of the effects of the use of multimedia on listening comprehension *System,* 25(1), pp 39-54.

Brett, P.A. (1998) Using Multimedia - A descriptive investigation of incidental language learning. *Computer Assisted Language Learning Journal,* 11(2) pp.179-200.

Abbreviations

This is a list of the abbreviations used in this thesis.

Abbreviation	Meaning
CAI	Computer Aided Instruction
CALL	Computer Assisted Language Learning
CD-ROM	Compact Disc – Read Only Memory
EFL	English as a Foreign Language
ESL	English as a Second Language
HSPM	Human Speech Parsing Mechanism
IL	Interlanguage
IVD	Interactive Video Disc
L1	First Language (i.e., mother tongue)
L2	Second Language
LC	Language Chunk
MCI	Media Control Interface
MHz	Megahertz – a million oscillations per second
MPCII	Multimedia Personal Computer II
NNS	Non-native Speaker
NS	Native Speaker
PC	Personal Computer
PPP	Preliminary Phrase Packager
RAM	Random Access Memory
SL	Second Language
SLA	Second Language Acquisition
SRQ	Self Report Questionnaire
SSS	Sentence Structure Supervisor
SVGA	Super Video Graphics Array
TEFL	Teaching of English as a Foreign Language
TOEFL	Test of English as a Foreign Language
TV	Television
V	Video only treatment group
VS	Video and subtitles treatment group
VT	Video and tasks treatment group
VTS	Video, tasks and subtitles treatment group
WWW	World Wide Web

ABSTRACT

This thesis explores the application of multimedia software to second language learning, based upon the ideas, hypotheses and principles of second language acquisition theory. Multimedia capable computers deliver information through combinations of video, sound, animation, graphics and text in an interactive and user-controlled way. These characteristics make appropriately designed multimedia a powerful tool for communication, but as yet there are few SLA multimedia applications and little research into the effects of multimedia on SLA. This study has explored the research findings of SLA to discover how multimedia may replicate the optimum conditions for language learning. The effect of the external linguistic environment, the cognitive process of SLA, the role of motivation and desirability of creating autonomous language learning were found to be significant factors. In addition, research findings on the ways that computers can assist SLA, together with contemporary pedagogic approaches to SLA were surveyed. A multimedia application, informed by these factors, was created.

Five research studies into its effectiveness were undertaken. Learner attitudes were highly positive and a significant overlap was found between less able listeners and positive attitudes. The integration of the application into the curriculum as a mandatory, assessed component of a module was not successful. The provision of instant real-time feedback to on-line listening tasks was shown

to increase comprehension. Subtitled-video was shown to be more effective for comprehension and language recall than other combinations of learning resources. Finally, there was clear evidence indicating the implicit learning of linguistic items which had been made salient in the multimedia applications.

1. Introduction.

1.1 The background.

Since 1991 the increases in the speed, capacity, and the power of personal computers have made it possible to create multimedia software. This software can combine: video, sound, animation, graphics, pictures and text in a single application. The integration of multiple information types is perceived to benevolently contribute to improved communication between computers and users. This is achieved through the provision of a high level of interactivity, the ability to use combinations of different types of media to convey the same or similar information, and the ability to convey information in its naturally occurring state e.g, video clips or newspapers can be depicted as the original. The aim of instructed second language learning is to develop communication in a second language. It has traditionally used all of these media in analog form to pursue its aims. Consequently, multimedia software applications that are dedicated to promoting language learning by incorporating all these elements in an interactive and pedagogically meaningful way should have a useful role to play in facilitating such goals.

1.2 The overall purpose.

This study aims to investigate to what extent multimedia language learning software has a positive and beneficial role to play in second language learning. This issue will be approached in the following way. Firstly, the theoretical and

research literature from the field of second language acquisition (SLA) is examined to identify the relevant hypotheses about how second language learning might be facilitated and the ideal conditions under which this is achieved. Secondly, the design and production of a multimedia language learning program based upon these theoretical ideas is described. Thirdly, language learners' use of this multimedia application is researched, again in the light of the initial theoretical ideas from SLA, in order to evaluate aspects of its effectiveness.

1.3 The context of this study.

The study takes place in the following context:

- English is spoken as first or near native second language by over 700 million people (Crystal, 1997).

- English is, at present, the world's main language for the business and academic communities and the world is becoming a global marketplace.

- The communications and digital revolutions of the 1990's have facilitated a worldwide boom in personal computer ownership

- The development of educational multimedia materials is very costly and labour intensive so it is important to understand if, and how, they contribute to learning.

- The research base on the design, use, and effectiveness of multimedia language learning software is very small.

1.4 The main aims of the study.

There are very few multimedia applications dedicated to developing SLA in the field of business English. Eastment (1997) lists five. There are few descriptions which relate themes from SLA theory and research to the use of multimedia for such a purpose. There are no multimedia applications dedicated to the development of listening comprehension. There have been no or few research studies, reported in the literature, on:

- learners' attitudes to multimedia,
- their attitudes to the use of multimedia as a formal element in their curriculum,
- the effect of multiple media on comprehension,
- incidental language learning through extended use of multimedia,
- the effect of multimedia on listening comprehension

The main aims of this study are:

- to bring into focus the themes in SLA theory which provide a rationale for the use of multimedia,
- to use these themes as guiding principles for the creation of multimedia software,
- to design a multimedia application underpinned by these ideas,
- to investigate the use of the multimedia application as to

  learners' attitudes,

  its integration into the curriculum,

  the effects of multiple media on listening comprehension,

  the incidental learning effects of its extended use,

  the effect of real-time feedback on listening comprehension.

1.5 Outline.

This study addresses its overall purpose as follows. The first three chapters provide an overview of the theoretical ideas and research findings from (i) SLA, (ii) the processes of listening comprehension and (iii) computer assisted language learning. These ideas suggest that appropriately configured multimedia software should have a positive role to play in SLA.

Chapter 2 describes four themes from the SLA literature which identify some of the conditions for facilitating second language learning that can also be articulated in the design of multimedia applications. These are:

- the role of the external linguistic environment,
- cognitive accounts of the internal processes of second language learning,
- the role of motivation in SLA,
- the promotion of autonomous language learning.

These theoretical ideas suggest that the construction of a multimedia application which aimed to develop SLA through listening comprehension would be a productive use of the technology.

Chapter 3 is, therefore, concerned with the processes of listening comprehension. It describes the processes of L1 listening, the factors which affect L2 listening comprehension and the current pedagogic approach to the development of L2 listening comprehension. The ideas from these three areas suggest that a multimedia application to develop L2 listening should be effective, and indeed may have inherent advantages over traditional pedagogic approaches. The literature review also indicates ways in which such an application might most productively be configured.

The construction of a multimedia application to develop SLA through listening comprehension also needs to be informed by the research findings on the effects of the use of computers, and in particular multimedia, on aspects of this process. Chapter 4 describes the findings of the, as yet quite limited, research on the effects of multimedia on aspects of SLA. Of particular relevance are the findings concerned with the effects of computer-delivered feedback and the effects of the

use of multimedia on vocabulary acquisition, listening skills development and learners' attitudes to language learning with multimedia applications. The research base provides further evidence that a multimedia application for the development of SLA through listening comprehension may be effective and also some additional suggestions about the ways in which such an application might usefully be designed.

The multimedia application created in the light of the ideas from the previous three chapters is described and illustrated in Chapter 5. The learning context in which the software was designed and was to be used is described first. This is followed by an account of how the application was configured to optimise the conditions thought to be most conducive to the development of SLA through listening comprehension. Crucial to the configuration is the nature of the learning content and so the rationale which underpins this is described and illustrated with material from the application. The final part of this study is concerned with evaluating aspects of the effectiveness of this multimedia application. SLA research again provides guidance as to the types of questions which can usefully be investigated. In addition, SLA classroom research suggests methods which might be used to gain data on the effects of multimedia upon the second language learning process. These are described in Chapter 6, together with an outline of the five research areas which comprise the remainder of the thesis

Chapter 7 describes the study investigating learners' attitudes to the use of the application. In particular it investigates learners' affective reactions to the use of

the application, their opinions on how useful the application might be to the language learning process and how useful they thought the application was for self-study. The study also investigated to what extent there were differences in these attitudes between learners of different abilities. The study described in Chapter 8 investigates learners' attitudes to the integration of the multimedia into their curriculum. It gained data on attitudes to the use of the application:

- over an extended period of time,
- as a mandatory element of their course,
- for the purpose of a formal assessment.

Chapters 9, 10 and 11 report studies into the learning outcomes of the use of the application. Chapter 9 investigates to what extent this multimedia application may contribute to an increased level of comprehension of spoken input and, if so, how any greater comprehension might have been achieved. Chapter 10 investigates the effects on comprehension of the different combinations of learning resources, which were configured in the application, namely: video, subtitles and tasks with feedback. The final investigation, reported in Chapter 11, looks for evidence that the extended use of the application has resulted in the incidental learning of language.

2. Themes from Second Language Acquisition Theory and Multimedia.

2.1 Introduction.

This chapter surveys the literature to extrapolate some of the conditions which facilitate SLA. Salaberry (1996) proposes that "The potential pedagogic effect of the technological tools used in L2 instruction (....) is inherently dependent on the particular theoretical or methodological approach that guides its application" (p. 7). The design and creation of an effective multimedia application for L2 therefore needs to be able to recreate the conditions which are thought beneficial to SLA. Doughty (1991a), too, is concerned that the research enterprise of CALL should not lose sight of its ultimate goals and its place within the field of language learning. She reminds us that:

> It is important to recognise that language learning within the technological environment of interactive videodisc (IVD) is primarily language learning and secondarily IVD language learning. (1991, p.1)

Dunkel (1991a, p.xiii) articulates the line of enquiry followed here as "... to think through the relevance of the enterprise of technological innovation to the basic business of language learning." The field of SLA is not the only theoretical perspective that could, or has, been used to frame CALL design, development and evaluation. Levy (1997, pp. 47-75) notes some 24 different disciplines and

fields which CALL developers and researchers believe have influenced their work. None of these fields, though, provides principles directly related to instructed language learning. As Chapelle observes:

> ... if progress is to be made in CALL, it seems necessary to shift from general approaches such as those of psychology, computational linguistics, and educational technology to the specific questions and methods of researchers who investigate instructed SLA. (Chapelle 1997, p.28)

What is more, there are significant themes in SLA theory and research which indicate that multimedia should be able to have a positive impact on the second language learning process.

SLA research is in its infancy and only began in earnest in the late 1960s. Early SLA research was pedagogically motivated e.g.; Dulay and Burt (1973), but with a dramatic increase in SLA research endeavours the field split into sub-groups of enquiry. Some of these fields are not directly concerned with language pedagogy, for example the research into Universal Grammar by Chomsky (e.g., 1986). Despite much research over the last thirty years and many lengthy syntheses e.g., Larsen-Freeman and Long (1991), Ellis (1990), Ellis (1994), and Ellis (1997), it would be wrong to claim that we have anywhere near a complete understanding about how second languages are learnt. Indeed the field is still questioning many of its most widely accepted assertions, see Block (1996). Ellis, towards the end of his lengthy review of the findings of SLA research to date, has to forlornly conclude:

> It is probably true to say that SLA research, some 25 years after its Inception as an identifiable field of enquiry, is characterised by facts, opinions, explanations, positions, and perspectives that frequently exist in an uneasy state of complementarity and opposition. (Ellis 1994, p.689)

Consequently, the ideas discussed here are by their very nature tentative. Ellis' (1994) overview of SLA research is divided into these four sections:

- the description of learner language,
- the explanation of SLA in the light of external and internal factors,
- explaining the individual differences in SLA,
- research into the SLA classroom.

Four themes taken from the last three of these areas inform this study:

1. the role of the external linguistic environment in SLA,
2. cognitive accounts of aspects of SLA,
3. motivation and its relationship to SLA,
4. the promotion of autonomous SLA.

2.2 The role of the external linguistic environment in second language acquisition.

Larsen-Freeman and Long (1991) describe the importance of the role of the linguistic environment:

> ... research on the linguistic environment is of considerable theoretical interest. The role (if any) of environmental factors in first or second language acquisition affects the power and scope of any innate linguistic or cognitive contribution it becomes necessary to posit in the learner ...The linguistic environment is not just of theoretical interest, however. It has potentially great importance for educators of various kinds too, since input (and the structure of conversation) is something that can be manipulated. Research findings are of interest to SL materials writers, SL curriculum developers and classroom teachers .. (1991, p.128)

The examination of the effects of the learners' external linguistic environment on SLA has been focused on three main areas: the role of L2 input, the comprehension of L2 input and the relationship between the processes of comprehension and SLA. The role of input will be considered first.

2.2.1 Input.

Input has been defined as "...the potentially processable language data which are made available by chance or by design, to the language learner" (Sharwood Smith 1993, p. 167). In the 1950s and 1960s the debate between Skinner and Chomsky about the child's acquisition of language started the enquiry into how input is related to acquisition. Behaviourist learning theory (e.g., Skinner, 1957) supposed that language learning occurred through a stimulus → response → feedback process. This model of learning supposed that imitation was a necessary precondition for language learning. Learners would receive language input through listening as stimulus, and learn through imitation of this input. Imitation, together with the effects of corrective feedback acting as a reinforcement, would lead to the successful internalisation of new language items which would be added to the learner's grammar. Listening had a key role in the behaviourist view of language learning, both as the channel for the input of the

stimulus, and also for the reinforcement of learning. Early SLA theories assigned key roles to input, as stimulus, and feedback.

This view of language learning was discredited largely through the work of Chomsky (1959). He believed that learning of L1 was unlike the learning of any other complex skill and that humans innately possess a language acquisition device which could be used to act on language input and create language capability. For Chomsky then, input served to trigger the innate language learning processes and mechanisms with which humans are born. He did not address the question of L2 learning, but these innatist ideas influenced the role ascribed to input by later SLA theorists, such as Krashen (1982,1994).

The current consensus is that SLA cannot occur without access to the L2 and is summed up by Ellis (1994):

> In all likelihood, input combines with other factors such as the learner's L1, the learner's communicative need to express certain meanings and the learner's internal processing mechanisms. No explanation of L2 acquisition will be complete unless it includes an account of the role of input.. (1994, p. 288)

The study of the relationship between input and SLA has focused on the features of the input.

2.2.2 Frequency of input and its relationship to output.

This line of enquiry hypothesised that the frequency with which language items occur in input is related to the order in which they will be produced by learners.

Ellis (1994, p.271) charts some eight studies e.g., Larsen-Freeman (1976), Snow and Hoefnagel-Höhle (1982) and Lightbown (1983) all centred around acquisition of morphemes. The results of these studies have been mixed, with some finding a positive correlation between input frequency and output e.g., Long (1981a), and others e.g., Lightbown (1983) and Long and Sato (1983), not. Ellis (1994, p.273) concludes "Overall there is little evidence to support the claim that input frequency affects L2 acquisition, but there is little evidence to refute it." Larsen-Freeman and Long (1991, p.92), though, summarise that these studies ".. provide strong evidence that interlanguages exhibit common accuracy / acquisition orders" and show "... sufficiently consistent general findings for the commonalities to be ignored."

2.2.3 Comprehensible input.

Many SLA researchers and language teachers see access to comprehensible input as one of the key factors in SLA. This is input which contains structures just beyond the learner's current level of competence. Influential in propounding this connection between comprehensible input and SLA has been the work of Krashen (1981, 1982, 1985, and 1994). Research into comprehensible input evolved from descriptions of language as social interaction, and of discourse as a semiotic system for the making and exchange of meanings (Halliday, 1978). Analyses of interactions between native and non-native speakers e.g., Hatch (1978a, 1978b) looked at how comprehension was achieved. Building partly on the results from such analyses, Krashen proposed that for acquisition to occur,

learners must be exposed to and understand the semantic content of language which is just above their current level of competence or interlanguage. He says:

> ... a necessary condition to move from state i (i.e., current interlanguage ability) to state i + 1 (i.e., control of linguistic structures just beyond the current psycholinguistic processing level of the acquirer) is that the acquirer understand input that contains i + 1 level input, where 'understand' means that the acquirer is focused on the meaning and not the form of the message. (Krashen, 1977, p.21)

In addition, Krashen's Monitor Model contains four other connected assumptions about language learning and acquisition. He maintains that acquisition and learning are different processes, and that only acquisition, the result of engaging in meaningful interaction, develops fluent communication. Learning and acquisition do not affect each other. He believes there is also a natural order for the acquisition of grammatical morphemes, which cannot be altered by instruction, although the evidence as reported above is not conclusive. Another tenet of Krashen's model is that learners have an "affective filter" which may operate to prevent input becoming acquisition. The affective filter is an imaginary barrier which learners involuntarily put up when stressed, unmotivated or self-conscious. The last hypothesis in Krashen's model is that learners have a "monitor", which initiates communication and serves to judge the correctness of their output. Krashen has received much criticism for his theory e.g.; Gregg (1984) and Ellis (1990). These criticisms centre around the theory's untestability and his assertion that the two processes of learning and acquisition are quite distinct and do not interact with each other. However, his ideas did serve to highlight and stimulate debate about the role and nature of input in facilitating comprehension, and the possible role of comprehension in SLA. They have been an influential catalyst for further research.

2.2.4 Comprehension of non-interactive input.

Non-interactive input is that which is experienced in situations where the listener has no opportunity to participate in the interaction. Investigations into the type of linguistic conditions in non-interactive input, which seem to promote understanding, suggest that there may be three helpful features. Firstly, there is a slower speech rate. Work by Conrad (1989) and Griffiths (1990) suggests that there exists a threshold level of 200 words per minute, above which English becomes problematic to comprehend for Intermediate and Advanced learners. Another factor found helpful for comprehension was bimodal input, which provides access to the written and spoken forms simultaneously, e.g., Holobow, Lambert and Sayegh (1984). Studies of speech rate and bi-modal input will be examined in greater detail in Chapter 3. A third common feature of non-interactive texts found to be effective in promoting comprehension was the 'elaborative modification' of the discourse. These being linguistic strategies such as: simplification, paraphrase, synonyms, and use of cleft constructions. Research on comprehension outcomes using written or spoken input texts, which contained large amounts of these features, have consistently showed greater resulting comprehension.

2.2.5 Comprehension of interactive input.

The interactionist view of language learning asserts that:

> .. a crucial element in the language acquisition process is the modified input that learners are exposed to and the way in which native speakers interact in conversations with learners. (Lightbown and Spada, 1993, p.29)

The process of interaction has been found to make both input and output more comprehensible. Analyses of the interactions between native and non-native speakers looked at what happened when comprehension broke down e.g., Hatch (1978a, 1978b) and sparked interest in the possible connection between SLA and interaction. The interactional exchanges between native speakers (NSs) and non-native speakers (NNSs) were found to contain "moves" or turns in the discourse. Some of these moves clearly functioned to mend communication breakdowns. Research interest then turned to such speech events and their role in facilitating comprehension. Long (1981b, 1983) found an abundant use of what he called "clarification checks, confirmation checks, and comprehension checks." Comprehension was seen to be promoted by these types of modifications to the discourse. Later Long and others e.g., Gass and Veronis (1985) termed these discourse features 'negotiation'. Long (1983) proposed that this type of interactive input was more important in aiding comprehension than the features of non-interactive discourse discussed above. Pica (1994, p.497) sums up their role:

> ... these features of negotiation portray a process in which a listener requests message clarification and confirmation and a speaker follows up these requests, often through repeating, elaborating, or simplifying the original message. (Pica 1994, p.497)

Illustrative of the research into the effects of such linguistic acts is a study by Pica, Young and Doughty (1987). This compared different conditions of input on

learners' ability to comprehend instructions. They found that a group who were given the chance to seek the clarification of a set of verbal instructions which were given to them, and thus also had the opportunity to try to clear up any misunderstandings that they might have had, ended up understanding more of the instructions than did groups who did not have such clarification opportunities. Another study by Li (1989, cited in Ellis, 1994, p.281) found that sentence comprehension was enhanced by provision of contextual cues, where word meanings were made clear by the context. These results have been confirmed by many other such studies e.g.; Lightbown (1983), Porter (1986), Loschky (1994) and Pica (1992). It appears that in interaction the process of negotiation positively contributes to comprehension of input.

2.2.6 Input and comprehension of NNSs output.

The final feature of the learner's external environment which has been investigated in relation to comprehension is the role of the learner's output. NS feedback has been found to provide information on the non-comprehensibility of the sounds, grammatical construction, and vocabulary of NNSs output (Pica 1988, 1992, 1994). Further analyses of the parts of the exchanges which followed these corrective feedback signals, showed that NNSs were also able to reformulate their original output along the lines indicated by NSs. However, improvement in NNSs' output seems to be influenced by how the feedback was articulated by the NS. Use of open-ended questions was found to be twice as

likely to promote a modified response from the NNS. Pica sums up the effect of feedback to learners' output:

> ... when learners use their interlanguage resources to communicate with NSs, they set up a basis from which they can be given feedback on their production - the meaningfulness of its content, the processibility of its form, or both. As a result, the learners modify an original message toward greater comprehensibility, often adjusting its form. (Pica 1994, p.514)

2.2.7 Comprehension and SLA.

The studies reviewed above show how comprehension of input can be increased by the presence of certain linguistic features in non-interactive input and by the process of negotiation in interactive discourse. What then is the evidence for supposing that comprehensible input leads to, or causes, SLA? The answer is that there is little apart from indirect evidence which according to Ellis:

> .. supports the common-sense assumption that learners need to understand input in order to learn from it. It is less clear whether this evidence warrants the claim that comprehensible input is a causative factor in L2 acquisition. (Ellis 1994, p.278)

The indirect evidence comes from a number of different sources. Studies in classroom learning which compared the effects of different teaching methodologies, for example, Total Physical Response (Asher 1977) produced better results than audiolingualism, arguably because the linguistic environment was richer in comprehensible input. Immersion classes in Canada, using comprehensible subject-matter were very successful e.g., Swain and Lapkin (1982), Genesee (1987). Research into the SLA of groups who have not had

any access at all to comprehensible input shows that such groups either, do not acquire at all, or only acquire limited phrases or formulaic language. Dutch children do not learn large amounts of German by watching German TV (Snow, van Eeden and Muysken, 1981). Hearing children of deaf parents do not learn through watching TV, and only catch up with their peers when they begin to interact with them (Sachs, Bard, and Johnson, 1981).

It has also been proposed that there is a relationship between comprehensible input and acquisition which is the reverse of that proposed above. This perspective maintains that acquisition will only occur when input or output is not understood (Faerch and Kaspar, 1986; Sharwood-Smith, 1986). It is when the learner recognises the gap in her knowledge which has created a misunderstanding that development can occur. White (1987, p.95) puts forward a similar description of the relationship between acquisition and comprehension, saying that "... the driving force for grammar change is that input is incomprehensible." Such non-comprehension may lead the learner to a closer scrutiny of their linguistic formulation of the message, and to consciously examine why it was not understood.

Finally, in support of the relationship between comprehensible input and acquisition is the fact that comprehensible input is an ever present factor in all cases of successful SLA. Ellis (1994, p.279) proposes that the relationship between comprehensible input and SLA is thus "Comprehensible input can facilitate acquisition but (1) is not a necessary condition of acquisition, and (2) does not guarantee that acquisition will take place."

2.2.8 Negotiation of meaning and SLA.

Negotiation of meaning as conceptualised by Long (1996) is the process of comprehending imperfectly but then, identifying these instances of flawed communication and trying to resolve them. In face-to-face communication this happens when the normal conversational interaction is halted and then modified because of communication breakdowns. Miscommunication, as evidenced by modified interaction, focuses learners' attention on the language responsible for misunderstanding. The resulting negotiation serves to make this input comprehensible. There is some evidence that interactional modifications and / or the negotiation of meaning in conversation results in SLA. Doughty (1991b) conducted two experiments on the relationship between the opportunity to negotiate understanding and the learning of relative clauses and found positive, short-term learning effects. Learners were provided with pre-organised contexts for negotiation and given ample supplies of relative clauses in modified input. Li (1989, cited in Ellis, 1994) found that exposing Chinese ESL learners to sentences with ample contextual clues to negotiate the meanings of words resulted not only in better comprehension, but also in better retention of those words. Likewise, research by Loschky (1989, cited in Pica, 1994, p.519) on the learning of Japanese locatives found that the provision of such formal structures in negotiation led to the learning of such structures. Pica explains how the process of negotiation may result in SLA:

> ... the input modifications of negotiation, although directed toward successful communication of the direction of meaning, were ... done in ways that helped draw learners' attention to L2 form. (Pica 1994, p.506)

Negotiation may draw learners' attention to the meaning of new lexis and grammatical structures which had originally caused misunderstanding. Such negotiation means that learners had also received a greater amount of input, as well as the input which was aimed at clearing up any non-comprehension. Confirming that higher comprehension may have been due to the extra amount of input, Pica (1992) found that when the extent of the negotiated input was restricted, no added comprehension resulted.

Swain and Lapkin (1995) also see the negotiation of the comprehensibility of learners' output as contributing positively to SLA. Firstly, it enables learners to notice the gap between their output and what they intend. Responses from NSs about the source of misunderstanding indicate how communication has failed and which linguistic forms in learners' production are lacking. As well as indicating which aspects of language have caused such misunderstandings, it is likely that the interaction will include corrective feedback to assist in a reformulation or to push learners to modify or rephrase the original utterance. Pica summarises "Thus, through feedback, negotiation brings learners' attention to L2 versions of their interlanguage utterances and heightens their awareness of their own interlanguage system." (1994, p.514)

Secondly, Swain and Lapkin (1995) note that such forced modification may also promote reflection on the nature of error, and encourage metalinguistic diagnosis of the problem. In addition, output may be used to test out hypotheses, which if

they do not attract negative feedback, may confirm original rules. The effect of output on SLA can be summed up as:

> In producing the L2, a learner will on an occasion become aware of (i.e., notice) a linguistic problem (brought to his/her attention either by external feedback [e.g., clarification requests] or internal feedback). Noticing a problem 'pushes' the learner to modify his/her output. In doing so, the learner may sometimes be forced into a more syntactic processing mode than might occur in comprehension. (Swain and Lapkin 1995, p.373).

Larsen-Freeman and Long summarise the role of interactional modifications on SLA:

> Modifications of the interactional structure of conversation or of written discourse during reading .. is a [good] candidate for a necessary (not sufficient) condition for acquisition. The role it plays in negotiation for meaning helps to make input comprehensible while still containing unknown linguistic elements, and, hence, potential for acquisition. (Larsen-Freeman and Long, 1991, p.144)

This hypothesised facilitative role of negotiation of input and output in contributing to SLA suggests that the interactive nature of a multimedia environment may be harnessed to emulate these processes.

2.3 Multimedia and the replication of conditions in the external linguistic environment for facilitating SLA.

The previous section describes the broad requirements that a multimedia application, aimed at SLA development, needs to fulfil if it is to replicate those conditions in the external linguistic environment which are thought to beneficially contribute to the development of SLA. These are the need for L2 input, for this

input to be comprehensible, and for the provision of opportunities for users to negotiate the comprehensibility of the input.

The provision of L2 input is a prerequisite for SLA and multimedia provides a variety of media able to supply such input, sound, animation, written text, video and graphics. The benefit, though, of multimedia is that it can provide language input which simultaneously conveys the same or similar information through different media. Different media use different processing channels, i.e., moving video images, graphics, written text and animation use the visual processing channel, whereas sound uses the acoustic channel. There are indications that a multimedia configuration would benefit from provision of those features of non-interactive input found to increase comprehension. The provision of bimodal input which uses the same language, but delivers it through acoustic and visual channels, has been shown to be useful, as has the ability to control the rate of the input. These are explored in greater depth in the following chapter.

Indications are that comprehension of input, achieved through learner interaction with any L2 input, is useful for SLA and so multimedia needs to consider how it may be able to replicate the process of negotiation of meaning of input. The connection is articulated by Chapelle as:

> These interactional modifications initiated by the learner on input from the computer should yield similar psycholinguistic effects as those in oral face-to-face linguistic exchanges in which they were first investigated. (Chapelle 1997, p. 27)

Three ways in which multimedia may be configured to encourage learners to negotiate the meaning of language are: through the provision of learning support resources, by allowing individual control, and through the provision of meaning-focused tasks which guide, support and confirm comprehension.

Multimedia needs to provide extra resources which will enable learners to retrieve meaning from the input. These might provide the same types of information as would be available from a NS i.e., to clarify meanings of words or grammar. By augmenting input with a variety of learning support resources, e.g.; on-line dictionaries, subtitles, and comprehension tasks with corrective feedback, learners may have the necessary tools to be able to make non-comprehensible input, comprehensible. Secondly, multimedia needs to allow learners to control and determine their use of such features. The place, extent, length and type of learner / computer exchange, together with the choice of support feature, can be determined by learners according to their own pace, needs and preferred learning style, thus personalising the negotiation. Learners can engage in individualised clarification of meaning by exploiting available multimedia resources, where, when, and if, their own comprehension breaks down.

Lastly, multimedia is able to provide interactive tasks. Comprehension tasks may be written to guide learners towards comprehension of texts, written or spoken. Previously, real-time listening comprehension tasks with instant feedback as to success have been technically impossible to provide. Such listening comprehension tasks, coupled with feedback, may help learners to "notice the gap" in their comprehension. Furthermore, the multimedia environment may

provide access to the linguistic phenomena which have caused comprehension breakdown and the resources to facilitate a negotiated understanding of these problematic linguistic items. Doughty sums up the role that multimedia may be able to play in SLA from the interactionist perspective:

> The interactionist perspective on SLA provides a promising theoretical underpinning for research and development of IVD software for language learning. If language learning is seen as a regular and ongoing interaction between the learner's mental abilities and the linguistic environment, each contributing to language acquisition and each influencing the other, then the interaction between learner and the auditory and visual environment created in the IVD context may be hypothesised as facilitative to the second language acquisition process. (Doughty 1991a, p.3)

2.4 Second language acquisition - the internal factors.

Cognitive accounts of the SLA process aim to explain and model the internal, mental processes. These have evolved out of, and are framed by, theories which explain how the learning of any complex skill comes about. A general consensus model of the internal, mental processes involved in SLA, following Ellis, is shown in Figure 2.1.

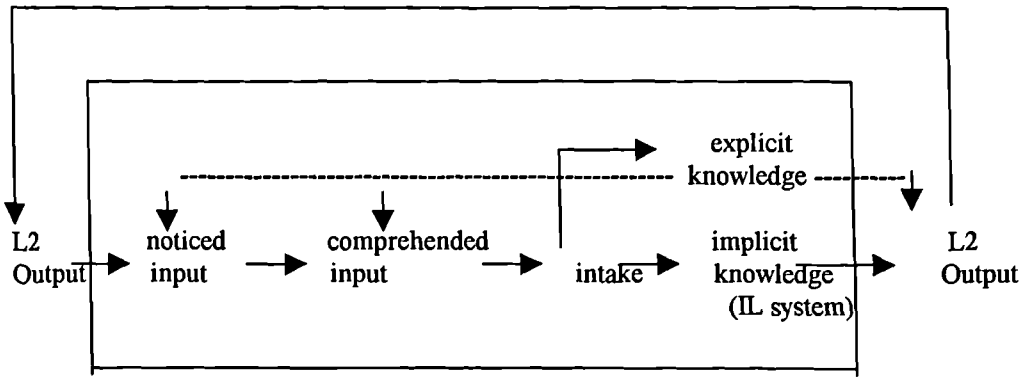


Figure 2.1 A consensus model of the cognitive processes in SLA (Ellis 1994, p.347)

Ellis has distilled this model from more than twelve different, cognitive models e.g., Tarone's 'Capability Continuum' (1983), Bialystok's model of second language learning (1978) and McClelland et al's 'Parallel Distributed Processing Model' (1986). The first step in the SLA process is that L2 input has to be available and to be attended to. This is what Gass (1988, p.201) calls a "passing through of the initial data." Such 'noticing' of the features of the L2 input depends on the tension between the linguistic items themselves and the current state of the learner's language knowledge. The linguistic items that are noticed may or may not be understood. Some of the noticed features may contribute to input which is comprehended, and this may in turn lead to intake. In other words, noticed and comprehended input may add to the learner's already existing store of linguistic knowledge. It may increase the store of explicit knowledge, knowledge about language, or the store of implicit knowledge, which is the current state of the learner's interlanguage. For input to be fully assimilated into the learners automatic repertoire it has to be mapped onto the already existing implicit or

explicit knowledge stores. Alternatively, such comprehended input may not be used for anything beyond communication. The intake process has been defined by Chaudron (1988, p.206) as "... a process which mediates between target language input and the learners' internalised set of rules." Ellis, though, is cautious about the scope of such cognitive theories to be able to fully explain SLA "It is not yet possible to construct a comprehensive cognitive theory of L2 acquisition, let alone an all-embracing theory that incorporates both a linguistic and cognitive perspective." (1994 p.408)

The following sections describe in more detail four aspects of cognitive language learning theory which relate to this study. These are:

i. The types of L2 knowledge - explicit and implicit,
ii. The development of explicit and implicit knowledge,
iii. The role of consciousness and 'noticing' in SLA,
iv. The development of control over the use of L2 knowledge.

2.4.1 The types of L2 knowledge - explicit and implicit.

This section describes the cognitivist perspective on the nature of linguistic knowledge, how this knowledge is learnt, the relationship be ween explicit and implicit knowledge, and the role of both knowledge types in SLA. It is widely supposed e.g., Bialystok (1982), Krashen (1982,1994), Schmidt (1990) that there are two kinds of L2 knowledge, explicit and implicit. The distinction between implicit and explicit knowledge originated from theorists such as Krashen and

Bialystok who were concerned with instructed SLA. This distinction revolves around ideas about the role of consciousness in SLA. Explicit L2 knowledge is knowledge about the L2, it is conscious and can be articulated. Implicit L2 knowledge underpins the ability to use the L2 and is subconscious. It consists of the rules and the lexicon which operate to make language, allowing the learner to produce their own utterances, as well as formulaic phrases. More recently SLA theorists e.g., Faerch, Haastrup and Phillipson (1984) and Schmidt (1990) have come to view L2 knowledge as a continuum, with explicit and implicit at either end.

2.4.2 The development of explicit and implicit knowledge.

This distinction between explicit knowledge and implicit knowledge types led theorists to debate how both types might be learnt. Krashen (1982) believed the two types of knowledge to be distinct and impermeable, implicit knowledge was 'acquired' and explicit knowledge 'learnt'. In implicit acquisition the process is totally unconscious and results from exposure to, and out of the processing of, meaningful language in natural communicative situations. Learners are not thought to be aware of this process. This has also been termed 'incidental learning'. Implicit learning involves both intake and interlanguage revision. Intake happens when new linguistic items are noticed and placed initially in short-term or medium-term memory. Interlanguage revision occurs when a gap is noticed, probably subconsciously, between current interlanguage and the new linguistic feature in short-term memory.

Explicit learning, on the other hand, involves conscious operations whereby learners can make and test hypotheses, and is usually associated with grammatical rules and vocabulary. For example, Ellis, N. says the explicit learning of vocabulary might involve:

> ... the use of a range of metacognitive strategies: (i) noticing that the word is unfamiliar, (ii) making attempts to infer the word from context (or acquiring the definition from consulting others or dictionaries or vocabularies), (iii) making attempts to consolidate this new understanding by repetition and associational learning strategies such as semantic or imagery mediation techniques. (Ellis 1995, p.107)

There is, though, difficulty in explaining the relationship between the two types of L2 knowledge and SLA. The possibilities are that the knowledge and learning types are completely differentiated and impermeable (Krashen, 1982), or that explicit knowledge converts into implicit knowledge through practice (Bialystok, 1978; Sharwood-Smith, 1981). The consensus view (Terrell, 1991; Ellis, 1993) is that explicit knowledge enables learners to notice features of the input and contributes to the acquisition of implicit knowledge.

In instructed language learning both types of knowledge are held to contribute to language development and L2 classrooms and materials will usually contain activities designed to facilitate the learning of both. For example, the Grammar-Translation method, and Rutherford's (1988) view of learning grammar by "consciousness-raising", are examples of instructed approaches to develop learners' explicit knowledge. The role played by form-focused instruction in developing explicit knowledge is to "... sensitise the learner to the existence of non-standard forms in her interlanguage and thus facilitate the acquisition of

target-language forms" (Ellis 1990, p.195). The ideas about implicit learning are embodied in the communicative approach to language teaching e.g. Brumfitt (1984). Communication tasks e.g., Skehan (1996) are thought to develop implicit learning. Implicit knowledge is seen as being derived from meaning-focused instruction and "For acquisition to take place the learner must attend to specific linguistic features in the input and be ready to incorporate these into her interlanguage" (Ellis 1990, p.195).

2.4.3 The role of consciousness and 'noticing' in SLA.

Ideas about consciousness and its role in SLA are contentious, some theorists seeing it as pivotal to SLA e.g., Schmidt (1990), whilst others believe it too nebulous to consider e.g., McLaughlin (1990). The ideas put forward here about how consciousness may impact on SLA, follow Schmidt (1990, 1994). He sees four aspects of consciousness involved in language learning: intention, attention, awareness, and control. Firstly, there is 'consciousness as intention', where learners knowingly focus attention on memorising grammar or lexis, or on an understanding of input, and in the process acquire new L2 knowledge. The second sense, 'consciousness as attention' he defines as 'noticing'. Noticing also has other terminological definitions in the literature, 'focal awareness', (Atkinson and Schriffrin, 1968), 'episodic awareness' (Allport, 1979) and 'apperceived input' (Gass, 1988). Schmidt (1990, p.132) defines it as "Noticing thus refers to private experience, although noticing can be operationally defined as availability for verbal report, subject to certain conditions." He believes that noticing and its use

of conscious attention is necessary for language learning to occur. Robinson (1995) sees three types of attention:

(i) the processes which are involved in choosing the information that is to be processed and kept in memory,

(ii) the ability to process information, and

(iii) the mental effort in doing this.

Consciousness as awareness is the third sense developed by Schmidt. This refers to explicit knowledge, and to learners' awareness of the knowledge which they have already acquired. Lastly, consciousness as 'control' refers to the extent to which knowledge has been proceduralised. When starting to learn, learners focus conscious attention on the form of the language and, as they develop, controlled responses become automatic so freeing-up conscious attention capacity which can then be focused on new linguistic features messages.

Looking back at the diagrammatic overview of the cognitivist explanation of language learning in Figure 2.1 above, a key and initial role is given to learners' "attention" to particular linguistic features. This attention or 'noticing' may result in L2 input being understood and becoming intake. The idea is that if learners are aware of, and notice, a difference in the nature of the L2 input to which they are exposed, and / or that of the language they are producing, then changes may occur in learners' interlanguage to reposition it in a form closer to that of the input. Schmidt sees degrees of consciousness as relating primarily to input processing. These inform:

> ...(1) the process through which input becomes intake, related to the ideas of noticing and subliminal perception, (2) the degree to which the learner consciously controls the process of intake, the incidental learning question and (3) the role of conscious understanding in hypothesis formation, the issue of implicit learning. (Schmidt 1990, p.138)

There is no agreed definition of intake, but Slobin (1985) recommends distinguishing between preliminary intake, that which adds language to the knowledge store and can to be used to construct language, and final intake, the processes used to organise stored data into linguistic systems. Schmidt (1990, p.139) argues that for preliminary intake, "... intake is that part of input that the learner notices ... If noticed, it becomes intake." Evidence supporting the role of noticing in SLA is provided by Schmidt and Frota's (1986) study of a learner's diary. They examined the relationship between language that had been 'noticed' in input, and that which the learner subsequently used in communicative situations. The relationship between these two was very evident. In addition, none of the forms which were present in comprehensible input were used until they had been noticed. Schmidt says that this role of noticing applies to all aspects of language, i.e., lexis, pronunciation, grammar etc. This, though, does not automatically mean that if a language item is noticed it is also remembered and learnt, but that "noticing is a necessary and sufficient condition for converting input into intake" (1990, p.129). This view of the major role of conscious awareness in SLA, if true, indicates that the role of subliminal or incidental learning may not have the importance assigned to it by theorists such as Krashen.

The facilitative role of selective and voluntary attention for SLA has implications for instructed language learning when it is focused on aspects of the language

code, rather than on meanings. This type of instruction in specific aspects of language may prepare learners to notice such features when subsequently encountered in their linguistic environment. That such an approach can be successful was confirmed in the controlled study of the learning of relative clauses conducted by Doughty (1991b). It follows that when linguistic items are perceptually salient they have a better chance of being noticed and thus of becoming intake. Likewise, the reverse, that when any linguistic items are ambiguous or difficult to perceive and notice, then they may remain troublesome items to convert into intake. The role of noticing validates the use of tasks in pedagogically driven language learning, as these can be used to predetermine what information or language forms are to be noticed. Rutherford's (1988) task-based approach to grammar is an example of this. Schmidt and Frota (1986) conclude, that by 'noticing the gap' between the state of one's current language knowledge and output, and then by consciously comparing this with what has been experienced in input, learners will make language gains.

2.4.4 The development of control over the use of L2 knowledge.

The accumulation of L2 knowledge and the processes involved in using this knowledge, are distinct entities. This section describes how learners are thought to gain and increase control over their use of L2 knowledge. Control over L2 knowledge refers to the processing system which is used during L2 language performance. Theoretical concepts which have been used describe the use of L2

knowledge are 'proceduralisation' (Anderson, 1985) and 'automatisation' (McLaughlin, 1987).

This account follows McLaughlin's information processing model (1987) because it had an impact on language learning pedagogy. It is apparent that learners have a limit as to how much information they are able to process and they are not able to attend to all the information available in input. There are, then, information-processing or handling techniques which enable some of the limitations of memory capacity to be overcome. McLaughlin sees two types of information-processing modes available to deal with L2 input, controlled-processing and automatic-processing. Explicit knowledge, that which can be articulated by learners, is used (as described below) during controlled-processing in short term memory. Implicit linguistic knowledge is stored and used as an information system which can automatically process input. Both of these processing modes require the participation of knowledge which has already been internalised and is stored in memory as nodes. McLaughlin (1990, p.134) takes his description of nodes from Shiffrin and Schneider (1977). Memory is seen as being:

> ... a large collection of nodes that become 'complexly interassociated' through learning. Each node is a grouping or set of informational elements. Most of the nodes are inactive or passive and, when in this state, the interconnected system of nodes is called long-term store. (McLaughlin 1987, p.134)

The controlled-processing mode requires active learner attention and control to temporarily connect independent memory nodes. When the task of dealing with the input is not present, these nodes return to their unconnected state and do not leave any effect on the state of long-term memory. Thus any L2 knowledge

which has been newly acquired is accessed by means of controlled-processing. The second information-processing mode, automatic-processing, occurs when specific L2 input activates an already connected set of nodes. This connected set of nodes has been formed as the result of learning. Automatic-processing is the result of practice in using the controlled-processing mode. Any increased ability of the learner to process progressively more complex input occurs through "restructuring", which means that controlled knowledge becomes automatic over a period of time, due to practice.

The literature on instructed language learning has explained how an increase in control over L2 knowledge might be developed. In terms of developing learners' control over implicit L2 knowledge, it may come from meaning-focused, communicative activities. Through participation in such real-time activities learners are given opportunities to use these cognitive procedures which automatize knowledge. Ellis (1990, p.184) sums up the cognitive perspective on how learners gain control over L2 knowledge: "... free practice enables controlled processing to become automatic. Learners need appropriate interactional opportunities to activate strategies for proceduralising knowledge."

2.5 Multimedia and the cognitive processes of SLA.

Multimedia needs to be configured to provide a learning environment to facilitate the development of both explicit and implicit types of L2 knowledge. There is a

continuum of task types that are currently used in L2 classrooms to focus upon explicit knowledge and which can also be used by multimedia applications. At one end there is direct grammatical explanation, and at the other, there are activities which ask students to work out their own rules and activities. Tasks such as those put forward by Willis and Willis (1996) serve to raise learners' awareness about grammatical forms and explicit knowledge. Tasks can be incorporated into a multimedia L2 environment through on-screen interactive activities with feedback provided. The use of bimodal input, so that audio input is juxtaposed with written subtitles, may also develop explicit knowledge, enabling learners to unpack the phonology, lexis or grammar of connected spoken discourse. Multimedia should also be able to facilitate learning of implicit knowledge. It can provide input, and by framing this with meaning-focused tasks, replicate real-life communicative situations. It is thought that implicit intake results when notice is taken of communicatively significant language.

If 'noticing' plays a key role in language learning, and if a degree of conscious awareness is necessary for noticing to occur, then multimedia needs to stimulate learners' conscious attention and subsequently advance any conversion of input into intake. There are four ways in which multimedia may be able to encourage noticing of input.

The first is through the provision of on-screen tasks which can be designed to make attention to particular linguistic features an essential part of successful task completion. These may be through provision of form-focused tasks designed to specifically raise awareness of explicit L2 knowledge. Alternatively,

comprehension-focused tasks can be written that necessarily revolve around an understanding of, and attention to, specific linguistic features, making their processing an essential part of the task.

A second way in which multimedia may facilitate noticing is through feedback which accompanies these tasks. Feedback indicating successful task completion confirms that existing knowledge has been applied successfully. Negative feedback may assist learners in noticing the linguistic features of any input which has caused misinterpretation.

Salience of linguistic items is a third way in which noticing might be encouraged, and multimedia has a variety of means to make language salient. This may be through the use of a particular on-screen layout, through the use of colour, or through the use of hypertext. Hypertext links from on-screen salient items can lead to additional screens, boxes, or displays of information. The marking of linguistic items through the use of colour and then using hypertext to provide explanations, definitions, simplifications or elaborations of the item, may draw learners' attention to those items, and provide sufficient further information to consolidate the noticing.

A fourth way of encouraging noticing is through the provision of resources which learners can use to negotiate comprehension. Thus the use of tasks and the provision of learning support resources may allow learners to resolve communication problems, and allow noticeable access to the features which have caused any breakdown.

Multimedia needs to replicate the conditions which are thought to develop control over L2 knowledge. Tasks which focus on the linguistic code e.g., grammar can be provided and so can descriptions of the rules of grammar or definitions of lexis. Problem solving tasks (Willis and Willis, 1996) to raise awareness of grammar rules may be productive. In addition, providing feedback may encourage reflection on gaps in existing explicit knowledge.

To develop control over and automatize implicit knowledge, learners can be provided with opportunities to use their language knowledge in real-time communicative situations. Multimedia applications can be configured to provide language as input which can be accompanied by meaning-focused communicative tasks. The tasks can be completed in real-time operating conditions and juxtaposed with feedback. Tasks which both support understanding and confirm success with comprehension can be included.

2.6 Individual learner differences and SLA - Motivation.

There is a large research base on the different factors within individuals which affect level and rate of SLA. Skehan (1989), in a book devoted to individual differences in SLA, reviews the research on the following factors: aptitude, motivation, language learning strategies and cognitive and affective factors. The latter he sub-divides into: anxiety, field-independence, risk-taking, intelligence and extroversion / introversion. Ellis (1994) categorises research on individual

learner differences and their affect on SLA into: learners' affective states, general factors (e.g., age, aptitude, learning styles, motivation), and learning strategies. The consensus view is that all learners come to their L2 learning situation with a variety of individual traits. These in turn affect their use and choice of a variety of learning strategies, and this then affects the rate and level of L2 achievement. If a language learning experience is enjoyable, thought of as worthwhile, and preferable to other comparable learning experiences, then it is reasonable to assume that it may lead to better learning and encourage more time spent in such learning.

2.6.1 Integrative and Instrumental Motivation.

The seminal works on the relationship between motivation and language learning are those of Gardner and Lambert (1959, 1972). Their original work was grounded within a social psychological perspective and based upon research carried out in Canada, a country where language learning is very much a social issue. They conceptualised two types, or orientations, of favourable motivation, "integrative" and "instrumental". An integrative orientation towards learning L2 arises because of "... a sincere and personal interest in the people and culture represented by the other language group" (1972, p.98). In contrast, instrumental orientation involves "... the practical value and advantages of learning a new language (ibid.:98)", thus for motives of personal advancement such as a better job, university entrance or further qualifications. Neither orientation was seen as

being qualitatively better, but both were viewed as positive contributors to success.

This classification of motivation into integrative and instrumental orientations was perhaps too simplistic, and the construct of motivation in SLA has expanded over the last ten years to include further types of motivation. Gardner (1985,1988) acknowledges the existence of different orientations or sources of motivation. These are reflected in the Attitude / Motivation Test Battery (1981; in Gardner and MacIntyre, 1991) which was developed to measure a number of attributes connected to SLA. This incorporates; attitudes to the learning situation, language anxiety and other attributes, such as parental encouragement. Further examples of different types of motivation were found by Clément and Kruidenier (1985) who delineated three other distinct general orientations: knowledge, travel and friendship. Oxford and Shearin (1994) found a variety of types of motivation for language learning in subjects learning Japanese, such as enjoyment from learning a difficult language. Skehan (1989) puts forward four, motivational hypotheses:

i. intrinsic motivation, arising out of interest in the learning task;
ii. resultative motivation, whereby success in a learning task increases or decreases motivation,
iii. internal cause, which is the motivation learners bring with them to the learning situation
iv. carrot and stick, by which external pressure will influence motivation.

The relationship between motivation and achievement in SLA is usually conceived of as being one of cause and effect. It might not be this straightforward. Many researchers, e.g.; Hermann (1980) and Strong (1984), have proposed that it is indeed the reverse. They hypothesise that it is, in fact, success and achievement in learning a second language which causes positive attitudes to that language, to the learning of the language, and to the target language community.

2.6.2 Motivation in the context of second language learning.

Crookes and Schmidt (1991), in an influential paper which reopened the debate on motivation, began to focus the research agenda more specifically on the second language learning situation. They sum up the research into instrumental and integrative motivation as having "... produced results that are mixed and difficult to interpret, so the best that can be said is that different attitudes and goal orientations seem important, but in ways that vary from situation to situation" (1991, pp. 478-479). They proposed that research into motivation should be broadened so as to embrace the totality of the language learning situation and examined at the following four, interrelated levels:

> ... (1) at the micro level, i.e., the relationships between motivation and the cognitive and metacognitive processing of second language stimuli; (2) at the classroom level, where learning tasks and activities may increase or decrease motivation; (3) at the syllabus level, where decisions about the content of the learning experience may influence motivation and; (4) out-of-class long-term factors. (Crookes and Schmidt 1991, p.483)

The first three relate to this study.

2.6.2.1 Motivation at the micro level - learners' attention to input and learners' use of learning strategies.

Crookes and Schmidt focus directly on individual learner motivation "... as it controls engagement in and persistence with the learning task" (1991, p.480). Motivation at the micro level influences learners' decisions in two areas. Firstly, motivation may influence towards which part of any input learners choose to direct their conscious attention. It is here that the learners' motivation to attend to the input and to notice linguistic features will be important. Motivation to attend to input can be under learners' voluntary control, and when it is, it is likely to be affected by " ... factors such as interest, dispositions, goals, intentions, and expectations" (Crookes and Schmidt, 1991 p.484).

Secondly, motivation may influence which strategies learners are motivated to use while experiencing and handling language input. The work on learning strategies by O'Malley, et al. (1989b) found that learners used both cognitive and metacognitive strategies. In listening comprehension the use of metacognitive strategies ".. that involve knowing about learning and controlling learning through planning, monitoring and evaluating the learning activity." (ibid. p. 422) distinguishes good from bad listeners. O'Malley, et al. define monitoring as:

> ... maintaining awareness of the task demands and information content. Two metacognitive strategies that support monitoring are selective attention, or focusing on specific information anticipated in the message, and directed attention, or focusing more generally on the task demands and content." (O'Malley, et al. 1989b, p.422)

VanPatten's (1990) study of learners' attention to form and content is further evidence of this use and availability of conscious attention. Kanfer and

Ackerman (1989) also see motivation as operating at this level, defining it as: "... the direction of attentional effort, the proportion of total attentional effort directed to the task (intensity) and the extent to which attentional effort towards the task is maintained over time (persistence)" (p.661). Dörnyei (1994) adds two additional types of motivation at this learner level. These are the "... *need for achievement* and *self-confidence*, the latter encompassing various aspects of language anxiety, perceived L2 competence, attributions about past experiences and self-efficacy" (Dörnyei 1994, p.279). In summary, it appears that individuals' motivation may affect both how attention is directed towards input and the choice of strategy that is used to handle language input.

2.6.2.2 Motivation at the classroom level.

The second level where the interchange between motivation and language learning might be observed is that of the classroom. Crookes and Schmidt (1992) see five dimensions of the classroom which may affect, or be affected by, motivational factors. These are: the preliminaries or opening stages of the lesson, classroom activities, feedback, the effects of learners' self perceptions and of the materials. Regarding factors which may affect motivation in classroom activities, they see that interest and curiosity may be increased by using less orthodox materials, and by deploying classroom procedures which vary. To maintain motivation, classroom activities have to be at a skill level equal to the competence of the learners, otherwise motivation will be adversely affected. Feedback can negatively affect useful language learning behaviour such as risk-taking, for example if learners are constantly being graded. Also, imposition of

extrinsic motivation to learn through imposed tests, although it may temporarily increase motivation, may not result in learners developing their own intrinsic motivation. Deci and Ryan (1985) also suggest that intrinsic motivation may assist learning, but that imposition of extrinsic motivation may decrease intrinsic motivation. However, their research showed that if extrinsic rewards were internalised and sufficiently self-determined, or autonomously taken on by learners, then extrinsic motivation may not clash with intrinsic motivation. The type of feedback which might positively affect motivation is that which directs learners' attention to successful performance. As for the relationship between materials and motivation, interest and relevance may help. Deci and Ryan (1985) suggest that this relationship might not be that straightforward, as highly interesting materials may divert attention to the medium or to the messages, and away from the language or the use of the language skills they are intended to develop.

2.6.2.3 Motivation at the syllabus and curriculum level.

The third level of motivation operates at the syllabus and curriculum level. Concerns in language pedagogy with needs analysis and with negotiated syllabi e.g., Breen (1987), Nunan (1988a, 1988b) to account for and include learners' stated needs in their learning programme, seem to have embodied the importance of learner motivation. Therefore, if learners have expressed interest and enthusiasm for particular learning methods, topics, language areas e.g., pronunciation, grammar, vocabulary or particular skills development, then it would be appropriate to include these in their curriculum. It might be expected

that increased motivation would follow as the methods and topics should thus be enjoyable, interesting, and relevant to those who had chosen them.

Dickinson (1987) quotes Bachman's (1964) study that found that increased learner involvement in the decision-making process concerning their language learning, tended to result in increased motivation and, consequently, productivity. Another study by Gardner, Ginsberg and Smythe (1976) compared the effects of two sorts of instructional methods, lock-step grammar teaching with teaching which had a high level of individualised instruction. They found learners in the traditional programme had a more negative view of their teacher and were more likely to leave the class. Those experiencing the more individualised mode had more positive attitudes to learning the language and were more motivated to do well. Another perspective on how motivation may be increased at the level of syllabus has been put forward by McCoombs (1988) who advocates training in the self-management of learning. There is also a growing interest in the promotion of autonomous language learning e.g., Benson and Voller (1996), derived from studies of the "good" language learner e.g., Naiman (1977). It is believed that those who are able and motivated to take responsibility for, and manage their own learning, will be more successful.

2.7 Multimedia and levels of motivation.

At the micro level, multimedia may be able to increase attention and to assist in the development of useful language learning strategies. Motivation of some

learners to attend to the input may be increased through use of combined media. For example, the use of video, supported by subtitles, with instantly accessible definitions of language items, and by on-line tasks with synchronous feedback may motivate some learners to attend because such learning supports may make the input more comprehensible and accessible. These learning supports may also motivate some learners to "notice", and consequently increase their awareness of the linguistic features of the input, and to match these to their own knowledge. Relevant video may add interest and increase comprehension. On-line tasks may provide motivational goals for directing attention at the meanings communicated or on linguistic forms.

Learners' motivation to deploy useful learning strategies might also be beneficial to acquisition. Multimedia-delivered materials may well be capable of providing the forum for supporting, encouraging, or motivating the use of metacognitive strategies such as "monitoring" and being able to evaluate one's own performance. Directed attention may be encouraged through meaning-focused tasks with feedback. It might be that in the multimedia environment such metacognitive strategies can be used more easily, or conversely, it might be that it is the multimedia environment itself which motivates the use of such strategies.

In addition, a multimedia environment can be configured to allow for learner choice from a wide range of learning options. This flexibility offers each individual the chance of getting a suitable match between what she needs and what is offered. These choices may accommodate learners with different interlanguages, different cognitive styles, different learning styles, and different

needs, thus allowing learners to mould their own individualised learning experience. Such a range of flexible options may also provide learners with a forum for experimentation and exploration of individual learning preferences and learning processes. The fact that the learner needs to make such decisions may produce a more aware language learner. Some of the choices that can be offered in a multimedia environment are:

- learning content e.g., of what to watch or listen to, and how much,
- learning mode e.g., video or audio mode, and either supported or not by subtitles,
- to be active or passive e.g., to complete learning tasks or not,
- task type e.g., meaning-focused comprehension tasks or form-focused language awareness tasks,
- level of difficulty e.g., a choice between three levels of graded tasks,
- type of learning support; e.g., whether and when to use subtitles or on-line glossaries,
- sequence of learning e.g., what to do, when, and in what sequence,
- time and pace of learning e.g., learner control over when learning occurs and how much time is spent in each selected area,
- advice on language learning and manner of exploitation of the program via on-line help, print and save/restore options.

This extensive range of possibilities allowing learners to determine and control aspects of their learning experience may contribute positively to motivation, although some scholars warn of the dangers of providing too many options and

too wide a range of choice without also preparing learners to make such choices e.g., Barnett (1993).

Multimedia may well be able to increase motivation at each of the three classroom levels put forward by Crookes and Schmidt (1991), above. Firstly, at the level of a classroom activity, it may be that learners' attitudes will be more positive to the use of multimedia than to teacher-directed classes, or to the use of other technologies such as the language laboratory. The individualisation of learning and of learner control of tasks, strategies, and pace of learning, may contribute to more positive attitudes to the learning situation. Secondly, inclusion in the multimedia environment of instant yet private feedback to errors may increase motivation. As well as private feedback, a multimedia environment may also be configured to provide added learning support features that make transparent the reasons why answers are right or wrong. The investigation into individual causes of errors may motivate some learners. The third way in which multimedia may increase motivation is as language learning material. The provision of video, sound, subtitles, tasks, glossary explanations, may arouse interest. As a type of material, of course, motivation will depend on the relevance and interest of the media elements included in the multimedia application.

Lastly, at the level of syllabus and curriculum, motivation for some learners may be increased by accounting for learners' needs, their preferred methods of learning, and chosen language or skill areas. The characteristics of a PC-based, multimedia language learning may facilitate such conditions. Implicit in such

flexibility, and as an extension of the learner level motivation, is that a program of learning, a syllabus or curriculum or part of either, could be built upon learner dictated choice of topics, skill areas or patterns of learning. A multimedia environment could make such a learner-centred approach possible.

That multimedia applications can function as a free-standing learning arena, and can be used either as an adjunct to, or in place of, taught classes, shifts the locus of control regarding the method of delivery, the decisions about when learning should take place, and the allotted length of the learning time, to the learner. Free-standing learner controlled use of multimedia may motivate extended periods of study, enabling learners to choose when and how often they engage in learning. For example, a multimedia environment may contain materials for developing reading or listening skills, taking the development of such areas out of the classroom and placing them under learner control, freeing-up class time for more teacher-intensive activities such as work on pronunciation or the spoken skill.

2.8 Autonomous language learning.

Autonomous language learning refers to situations in which "... learners become self-directed (i.e. are able to determine their own learning objectives, choose their own ways of achieving these, and evaluate their own progress)" (Ellis 1994, p.516). The aim is to hand the responsibility for learning over to the learner. Dickinson (1987) defines self-instruction in language learning as follows:

> Self-instruction may mean a learner working away in isolation, but it is more likely to describe a situation in which learners undertake responsibility for a part of their learning. Also, it may mean a learner using materials which are designed to guide his every step and leave little freedom of choice, or it may describe a situation in which the learner designs his own course and makes decisions about when and how he is going to be assessed. (Dickinson 1987, pp.16-17)

2.8.1 Advantages of autonomous language learning.

Why might autonomous language learning be thought useful? There are several reasons put forward by Dickinson (1987). The first is as a solution to practical problems that learners might have in attending language classes. It is obvious that institutionalised L2 instruction may not be easily accessed by all who want it, and that the increase in digital technologies may have a role to play in accommodating potential learners with such difficulties. In addition to providing learners with increased opportunities, it may also assist institutional providers of language learning. Higher Education in the UK, for example, has had to respond recently to 'massification'. This has resulted in pressure to deliver quality learning, to larger amounts of learners, with fewer human resources.

A second and pedagogic reason for interest in autonomous language learning is provided by the documented relationship between individual learner differences which result in, and affect choice of, different language learning strategies. These in turn affect eventual levels and rates of achievement in SLA e.g., Skehan (1989). An autonomous language learning situation whereby learners take control over their own syllabus, topics, skill areas, etc. may be a way of accommodating such differences. It may also be a means of developing and encouraging the use

of learning strategies which have been found e.g., Naiman et al., (1978) to characterise "good" language learners. Generalising, good language learners have been found to be self aware, in that they understand their attitudes and feelings towards language learning. They are inquisitive, tolerant, and interested in finding out more about the language. They monitor their progress, are realistic and willing to take risks. Most of all, they are actively involved in the learning process and are organised in their approach to it. These strategies imply that learners take control and responsibility for their own learning.

Dickinson proposes that self-instruction is closely linked with the development of learners' intrinsic motivation to learn, believing that the following elements in a self-instructional mode of learning will promote intrinsic motivation:

> 1. learners' awareness of needs and goals 2. Perceived relevance of the course to achieving goals 3. Maintenance of self-esteem as a person through involvement in decision making 4. Degree of freedom to use preferred learning strategies. (Dickinson 1987, p.30)

A final advantage of self-instruction that Dickinson sees is that it may increase awareness of how to learn foreign languages. This knowledge about how to proceed effectively with one's own learning, in situations without recourse to teachers, may result in a higher rate and final level of attainment.

How then might autonomous language learning be facilitated? Materials he says are "... central to self-instruction" (p.43) and he lays out the criteria for facilitative self-instruction materials. These are: authentic input, meaningful

tasks, feedback, flexibility of use, clear instructions and advice, pathways of progression and accompanying reference materials.

2.9 Multimedia and provision of autonomous language learning.

The provision of a tool and an environment through which learners could autonomously develop their language skills was one of the rationales behind the creation of this multimedia application. It appears that multimedia may be able to provide a degree of autonomy in language learning by delivering good quality self-study materials in a flexible way.

Multimedia can be used in three, distinct ways for autonomous language learning. It can be used as one of a series of lessons. It can be used alongside a taught syllabus, covering material and developing skills which are not covered in taught sessions. Thirdly, it can be used in a completely autonomous context, by learners working outside of any institutional programme. Barnett (1993) though, warns of the dangers of providing too many options and too wide a range of choice without first preparing learners to make such choices. Through its use an institution would be assured of the quality of the materials, the learners would be able to decide when they used the application to suit their schedules, and those responsible for the taught syllabus would be able to use classroom time for more teacher intensive activities.

A multimedia language learning application may be adaptable by learners to accommodate their own language learning preferences. So, in addition to the choice of when to study, multimedia also provides learners with autonomy within each individual learning session. Learners can focus on language areas that they decide they need help in and ignore others. They can take as much time as they like, and exploit whichever of the variety of media that they prefer to learn from. They can work at whatever pace they choose, and use or not use, any off-line materials that they wish.

A further question in the use of multimedia for self-instruction concerns its effectiveness. If multimedia is to be regarded as a facilitative self-study environment then language educators need to have some evidence that it is in fact a mode of study where language learning or skills development does actually occur. Due to the hardware and software costs of the technology we need to be sure that it is useful to language learners and provides a cost-effective investment which is better than alternatives. It may be that multimedia provides learners with a tool which surpasses the learning effectiveness of those traditionally used for self-study and for listening skills development.

In summary this chapter has described four themes from SLA theory. These were the role of the learner's external linguistic environment, the internal cognitive processes of language learning, the role of motivation and ideas about autonomous language learning. Each of these has specific relevence to this thesis, the link as explained above, as they describe aspects of the language learning process which can be replicated in multimedia language learning software.

3. Second Language Listening Comprehension.

The account in Chapter 2 of the conditions and processes which are thought to contribute to SLA highlighted the importance of comprehensible input and the negotiation of comprehension as beneficial characteristics of the external linguistic environment. These themes suggest that an application which is aimed at the development of L2 listening comprehension would be a beneficial use of multimedia technology. The decision to produce an application focused upon the development of L2 listening, rather than reading comprehension, was made in the light of the following factors. It is accepted that the reading and listening skills use different processes i.e., Lund (1991), Buck (1992), although they may use the same database of language. Listening comprehension has become the cornerstone of many theories of SLA i.e., Asher (1977), Krashen (1985). The SLA literature is increasingly recognising the centrality of listening comprehension, i.e., Rubin (1994), Oxford (1993). Feyten states "More than 45% of our total communication time is spent listening. Speaking takes 30%" (1991, p.174). Studies of interactions involving L2 learners (see Krashen 1998, pp.175-182) show the majority of time is spent listening. For learners studying university subjects in addition to EFL, such as those targeted for this application, listening is essential for information transfer. L2 learners consistently report that listening comprehension is more difficult that reading, i.e., Ur (1984), Cauldwell (1996) and the reasons are outlined later in this chapter. Further reasons are to be found in the relationship between reading and the computer. It has been found that it is

more difficult, more tiring and 28% slower to read from a computer screen than paper (Thibodeau, 1997).

This chapter reviews the processes of listening comprehension in to order provide a theoretical basis for the design of the multimedia application. It describes L1 listening comprehension and then considers the additional factors which research has shown affect L2 listening comprehension. It then reviews the pedagogic approach to the development of L2 listening comprehension and concludes by describing how, in the light of the ideas from these three sections, multimedia may be configured so as to provide a productive environment for L2 listening comprehension and SLA.

3.1 A definition of listening comprehension.

At present, and despite much theoretical and empirical research, a consensus on a definition of the native speaker (L1) listening skill has not yet been reached. Witkin (1990), examining the state-of-the-art in L1 listening research, notes the lack of agreement upon a definition of listening, reflected in the wide range of vocabulary used in such definitions. Wolvin and Coakley found listening defined variously as involving:

> ... analysing, concentrating, understanding, registering converting meaning to the mind, engaging in further mental activity, responding, reacting, interpreting, relating to past experiences and future expectancies, assimilating, acting upon, selecting, receiving, apprehending, hearing, remembering, identifying, recognising, comprehending, sensing, evaluating, emphasising and organising. (1988, p.57)

Clark and Clark (1977) see both narrow and broad definitions:

> What is comprehension? In its narrowest definition it is the process by which listeners come to an interpretation for a stream of speech ... In its broader definition it also includes the process by which listeners use those interpretations for their intended purpose. (1977, pp.84-85)

Wolvin and Coakley approach listening from the perspective of cognitive processes and define the listening process as "the process of receiving, attending to and assigning meaning to aural stimuli" (1985, p.74).

These elements are found in most definitions of listening. The "receiving and attending to" is also called speech perception and refers to the processes of distinguishing phonemes, constructing these into words, recognising the prosodic features of stress and intonation and combining this information to construct the syntax. This is also known as "bottom-up" processing. Assigning meaning to the decoded stimuli via the interpretative and inferencing processes is referred to as "top-down" processing, and involves assigning communicative meaning to the decoded utterances based upon previous knowledge. Top-down processing may also assist in filling in gaps in understanding created by decoding failures.

Rost (1990) chooses to place the emphasis on the interpretative and inferencing processes:

> Understanding spoken language is essentially an inferential process based on a perception of cues rather than a straightforward matching of sound to meaning. The listener must find relevant links between what is heard (and seen) and those aspects of context that might motivate the speaker to make an utterance at a particular time. (1990, p.33)

Chaudron and Richards (1986, p.114), Anderson and Lynch (1988, p.13), Oxford (1993), Rost (1990) and the majority of scholars recognise and emphasise that any definition of listening comprehension must acknowledge that many processes work together in an interactive, overlapping and simultaneous fashion. Rost (1990) sums this up:

> ... a listener's interpretation continuously changes throughout a speech event, it is not accurate to speak of sequential stages in listening, starting with speech perception. It is more accurate to think of the processes of perception and interpretation as continuous, overlapping and mutually informing. (1990, p.83)

3.2 The processes in L1 listening comprehension.

This section describes the consensus on the constituent elements of the listening processes in L1. The psycholinguistic literature e.g. Anderson (1985) splits listening into three distinct interrelated but overlapping and recursive processes. These are:

- speech perception or perceptual processing,
- parsing or lexical and grammatical access,
- utilisation or comprehension,

and each will be described in turn.

3.2.1 Speech perception.

Speech perception in L1 is largely automatic, fast and happens effortlessly. Most words are recognised within 125 milliseconds of their onset (Marslen-Wilson and Welsh, 1978). How might this be achieved? There are two perspectives on this, the traditional perspective sees a two-stage process whereby sounds are identified and then assembled into sequences. These are then matched onto stored forms of words. The second sees no intervening level of phoneme classification. It proposes that lexical access is a result of mapping the results of auditory perception directly onto the word forms stored in the mental lexicon.

The traditional view of speech perception holds that we have a "... speech processing capacity which is peculiar to speech and distinct from that required in non-speech sounds" (Garman 1990, p.189) and that "Most researchers believe that there is a stage of phonetic representation intermediate between the acoustic input and words" (Harley 1995, p.45). The description of such a stage needs to account for the role of memory and describe the features of the input that are processed therein. However, the problem is:

> The beginnings of speech perception are found in the response of the neurophysiological components of the auditory system to the physical properties of the acoustic signal: the results of speech perception are found in our abilities to identify the sounds and words of our language. The problem lies in knowing what goes on in the middle region of these processes. (Garman 1990, p.188)

Explanations of the role of memory in speech perception have used a variety of terms for the part of the process which stores the raw, unanalysed speech. Nooteboom (1979) sees a two stage role of memory in speech processing from 'acoustic buffer' to 'auditory memory', and talks of a "... gliding time window, the contents of which are passed on to central processing mechanisms that extract auditory attributes like pitch, timbre, loudness and duration from the input signal" (1979, p.114). The acoustic buffer represents the exact physical properties of the signal, is brief, quickly emptied, and is determined by the neurophysiological properties of the auditory system. Sequentially, there is a second form of memory, 'auditory memory' which holds the results of the already processed contents of the acoustic buffer.

What are the features of the acoustic signal which are picked up by the processing window? The first possibility is that there is an initial stage of speech sound identification which is based upon the identification of phonemes. These identified phonemes are ordered into the sequences necessary for matching with the stored forms of words. The initial difficulty with this explanation is conceptualised through the psycholinguistic term 'invariance' which involves consideration of the properties of English phonemes and their acoustic variance. The points can be summarised thus:

- There is no regular match between phonemes and their articulation "... all phonemes change their perceptual features in different phonetic environments" (Rost 1990, p.38). For example, the "p" sounds in "park" and "pile" are different and conversely the pronunciation of the "t" and "d" sounds in American English of "writer" and "rider" are similar. The realisation of English phonemes is affected by context of the phonemes in which it appears. There are four types of variable realisation or connected speech rules (Rost 1990, p.38) which listeners need to accommodate. These are:

  i) free variation, e.g., the intrusive "r" in "I saw a film last night";
  ii) assimilations, e.g., "in the bottle";
  iii) reductions, e.g. "succeed in inviting"
  iv) elisions e.g., "terrorist attack".

- Individuals with their different vocal tracts will produce different acoustic results affected by their age, sex, regional and sociocultural characteristics and the context of delivery i.e., extreme agitation or pleasure. Nevertheless, the phonemes are still successfully perceived.

Despite these variations in the acoustic qualities of phonemes we have no difficulty in classifying speech sounds as one phoneme or the other. This is explained by "categorical perception". Experiments using artificially manufactured sounds and examining voice onset time (VOT) have provided evidence for average templates and the attendant 'categorised perception' of phonemes that facilitates discrimination among the different phonemes. Liberman

et al. (1957, 1985) used a continuum of artificially synthesised syllables and found that subjects agreed upon their categorisation of sounds presented to them as beginning with either /b/, /d/ or /g/. The consonants /d/ and /b/, for example, have the vocal cords vibrating as soon as the vocal tract is closed, but with the consonants /p/ and /t/ there is delay or VOT of about 60 milliseconds. Again researchers, using artificial sounds with a VOT of 30 milliseconds, midway between the two extremes, found that subjects similarly categorised the sounds into either voiced or unvoiced.

The approach described above argues that speech perception involves the linear processing of the phonological properties of speech and that it is this which is accomplished before words can be accessed. The other viewpoint put forward by psycholinguists such as Klatt (1979, 1989), Studdert-Kennedy (1981) and Marslen-Wilson and Warren (1994) is that speech processing makes no use of a phonemic decoding stage but maps sounds directly onto the word-store or lexicon. Klatt's (1989) Lexical Access from Spectra (LAFS), a phonological model of speech processing, proposes that it is not phonemes which are decoded and then matched against templates, but that it is the phonological template for whole words, stored along with other information about words in the lexicon which is matched with the acoustic input. Studdert-Kennedy (1981) argues that speech processing occurs for the purpose of understanding and that the point at which sound-meaning relationships are established is the lexicon. As the information about words stored in the lexicon consists of grammatical, semantic as well as phonological information, then the object of speech perception is to match sound with this stored phonological information. Although it appears that

the serial phonemic processing and the holistic word mapping views are incompatible, Garman suggests that:

> They may capture aspects of different and complementary processing Strategies used in human speech-perception ... It may turn out that the microstructural approach will improve our understanding of stimulus-driven early stages of signal processing, while the macrostructural approach may tell us more about the higher processes involved, once preliminary information about the signal is available, and the task is to make that information compatible with what the listener knows (a) about the language and (b) about the current utterance. (1990, p.207)

It is to the recognition of words that we now turn.

3.2.2 Recognising spoken words.

This section will describe two of the main models depicting how spoken words are recognised, the cohort model of Marslen-Wilson (1987) and the connectionist model from the Parallel Distributed Processing research group of McClelland (1986). In both models the key questions are: what are the stages of word recognition and what role does context play in each of the phases? Harley (1995) proposes that the stages of word identification, which may or may not overlap, are:

- initial contact
- lexical selection
- word recognition

The cohort model (Marslen-Wilson 1987, 1989) uses the concept of real-time, linear processing and suggests that all words are recognised from the phonological information available at the beginnings of words. This initial phonological information, once decoded, raises a "cohort" comprising of all the known words that have similar phonological beginnings. To illustrate this, if the word "crash" is spoken, then once the initial phoneme "k" has been decoded then all words in the hearer's mental lexicon that start with a "k" sound are possibilities (the cohort). Further decoding that adds an "r" sound to the "k" means that all words which don't match the "kr" cohort drop out and so on until the word is complete. Recognition occurs at the "critical recognition" point when only one remains possible from the acoustic-phonetic information.

The TRACE model of spoken word recognition, Rumelhart and McClelland (1986), is not based upon unfolding modules of understanding but sees several levels of processing happening simultaneously and interacting. They see no separate level of phoneme recognition. This interactive model emphasises 'top down' processing where the role of context is of most importance. It posits that there are three levels of processing, distinctive features, phonemes and words and that there are cognitive units for each feature, phoneme and word. During speech processing all three units are activated to a greater or lesser extent. Having been activated above a certain level the units increase or decrease the activation of others. The units are simultaneously active during speech perception and interact with each other. Information flows bi-directionally between them. This model of a whole network of units is named TRACE because "the pattern of activation left by a spoken word is a trace of the analysis of the input at each of the three processing levels" (McClelland and Elman 1986, pp.66-67)

3.2.3 Parsing - understanding the syntactic structure of sentences.

When individual words have been recognised two types of information become available, its meaning and its syntax. Garman (1990) defines parsing as follows:

> The essence of parsing, as opposed to lexical identification, is that the listener is working with input that consists of lexically identifiable elements, temporarily sequenced; and is working towards determining the relationships of those elements as a part of the understanding process. (1990, p. 313)

How then do psycholinguists propose that the human speech parser mechanism (HSPM) works, and what role in the processing of syntax does semantic information play? There are autonomous and interactive perspectives on the HSPM. Autonomous descriptions propose that syntactic analysis is completed before any semantic analysis occurs, whereas the interactive position is that semantic information informs and guides syntactic processing.

The unit of parsing is believed to be the clause (Harley 1995, p. 151) and researchers e.g., Bever (1970), Fodor, Bever and Garrett (1974) have proposed that listeners use strategies based upon the surface structure of the sentence to unravel the syntax. An example of such a strategy is the use of the knowledge that articles signal that a noun phrase has started, or that English sentences frequently have a Subject-Verb-Object sequence. These simple strategies are tried first and if they don't succeed then further parsing needs to be done.

One of the most influential autonomous accounts of the HSPM was provided by Kimball (1973) who proposed seven principles of surface structure parsing, all closely connected and interacting with each. Briefly, these are:

1. Parsing is top-down: interpretation begins from the sentence node and predicts the constituent elements.
2. Right association: words are attached to the nearest logical place on the right.
3. New nodes: these are signalled by the grammatical function words.
4. Principle of two sentences: the elements of no more than two sentences can be parsed at once.
5. Principle of closure: phrases are closed down as soon as possible.
6. Fixed structure: when a phrase has been parsed it is costly in terms of processing to go back and re parse it.
7. Processing: when a phrase has been parsed it is passed from short-term memory into a stage of deeper semantic processing.

This model is autonomous in that the syntax is worked out as a prerequisite to the parsed units being sent off for semantic analysis. A refinement to this model was the two stage "sausage machine" proposed by Frazier and Fodor (1978). The first stage was termed the *preliminary phrase packager* or PPP and the second the *sentence structure supervisor* or SSS. They explain the two stages thus:

> The first stage parser (called the PPP) assigns lexical and phrasal nodes to substrings of roughly six words. The second stage parser (called the SSS) then adds higher nodes to link these phrasal packages together into a complete phrase marker. (1978, p.291)

The PPP is deemed to have a limited processing window and cannot attach words to others which are more than six words away. The SSS assembles the groups produced by the PPP but cannot itself change the information from the PPP These two accounts of parsing are 'bottom up' serial models, in that the first part of the process is automatic, is carried out by a structurally driven syntactic parser and only delivers one phrase structure. If this first pass yields a parse which is not consistent with other semantic information then a second pass is needed.

Parallel and interactive models, as opposed to the serial, autonomous models propose a different view of the HSPM. The parallel processing models i.e., Altman and Steedman (1988) and Mitchell (1994) see the parser as progressing on a word-by-word basis. So for each word a variety of alternative syntactic interpretations are available and exist in parallel with each other. The decision about which choice is made is guided by the context of the utterance. In this real-time on-line approach, at any time during input of spoken language all that is available to the syntactic processor is that which has already been analysed and that which it already knows about the language. So the body of knowledge about the current utterance increases until the analysis is complete. This model suggests then that syntactic parsing is affected or guided by semantic factors and, therefore, that there is interaction between the parser and the interpretation of the message. Marslen-Wilson and Tyler (1980) summarised the view that understanding spoken language was the product of interactive parallel processing, following a series of experiments:

> The combined results, presenting a detailed picture of the temporal structuring of these various processes, provided evidence for an on-line interactive processing theory, in which lexical, structural (syntactic), and interpretative knowledge sources communicate and interact during processing in an optimally efficient and accurate manner. (1980, p.1)

Much of the research aimed at uncovering the working of the HSPM has used *garden path* sentences. These sentences are constructed so that the initial part of the sentence leads the listener to make one highly likely interpretation of the meaning which is then confounded by the later part of the sentence. Examples of garden path sentences often quoted are "The horse raced past the barn fell" and "The old man the boats". Harley sums up the evidence from the study of garden path sentences:

> ... a great deal of it seems to lead to contradictory conclusions. At present, on balance, the evidence just favours an autonomous or modular system whereby syntactic processes occur independently of semantic and contextual processes. (1995, pp. 305-306)

3.2.4 Comprehension.

There is considerable work to be done to extract and interpret meanings from spoken utterances after the words have been recognised, their meanings computed and the syntax of the utterance has been parsed. Understanding the process of comprehension involves consideration of the types of knowledge which a listener needs to bring to render a meaningful interpretation of the spoken input. It also needs consideration of how knowledge is organised in memory. Rost (1990), in his introduction to listener inference of meaning suggests:

> ... it is important to emphasise the principle of meaning as active knowledge construction, rather than as passive recipient of information. Meaning in discourse is created by the listener within a personal knowledge domain. Meaning is created only by an **active listening** in which the linguistic form triggers interpretation within the listener's background and in relation to the listener's purpose. (1990, p. 62)

3.2.4.1 Prior knowledge.

One of the factors which effects the process of listening comprehension is the listeners' level of prior knowledge. The effect of prior knowledge on reading comprehension was demonstrated by Bransford and Johnson (1982). They gave subjects short passages to read, and either: i) supplied no context, ii) gave prior context or iii) gave context after the story was read. Those given the context before reading recalled more of the passage. Similar work was carried out by Arnold and Brooks (1976) with listening passages and they also found that supplying a meaningful context increased children's comprehension.

World knowledge is created through experience and is thought by cognitive scientists to be stored as schemata, a term coined by Bartlett (1932). Schemata are structures in semantic memory which specify how bodies of information are organised. These packets of knowledge are used to interpret linguistic input and to facilitate comprehension. Anderson (1985) identifies two types of schemata essential to comprehension, textual and content, or 'scripts'. Textual schemata are related to the discourse level convention of certain types of interactions e.g., the conventions of a meeting with an academic supervisor. Scripts (Schank and Abelson, 1977) are a special type of schema and refer to our situation specific knowledge of routine events, their goals and encounters. For example, a 'going to

a football match' script would have information about the roles and actions of the characters, places and the sequence of events. Knowledge stored as scripts, it is believed, helps listeners' inference of meaning, for example anaphoric reference. Story grammars i.e., (Mandler, 1984) are another hypothesised type of schemata which represent the discourse organisation of stories, jokes, narratives etc. and can be used to provide the expected arrangement of events in this type of discourse. Again story grammars may help in inferring what is not explicitly stated and in reducing the amount of necessary processing. Genres and their structures are a further type of schemata and refer, for example, to regular communicative events which follow the patterns of organisation, a sermon, a lecture, an after dinner speech. The knowledge of a genre's structure, it is thought, assists comprehension. Schemata, scripts, genre and story grammars describe how knowledge may be organised and how this may be used to infer meaning but they do not describe "how these inferences are made, how anaphoric resolution is done, or which items are foregrounded" (Harley 1995, p. 231).

3.2.4.2 Inferring.

The knowledge which listeners bring to spoken texts enables them to infer meanings, thus going beyond what is actually stated. Harley (1995, p. 216-218) notes that there are three types of inference. Firstly, logical inferences, i.e., "He ran in another marathon last week", therefore 'he' is fit. Secondly, bridging inferences which maintain the coherence and links between what is being spoken, for example in "He played a lot of football last year. This year he is injured

again". Here, to make sense of 'again' we need to infer that 'he' was injured last year during the matches. Thirdly, he sees elaborative inference, where world knowledge is used. Elaborative inference from 'pop star' might involve notions of wealth, fans, and TV appearances. In L2 listeners a lack of the appropriate L2 cultural knowledge has been shown particularly to hinder comprehension (Bremer et al., 1996).

Inference is most likely to be made on the aspects of the message which are most important, rather than the details (Seifert, Robertson, and Black 1985). McKoon and Ratcliff (1992) demonstrated that inferences are only drawn when it becomes necessary to make the text connect and when it is easy to make the inference from background knowledge or from what is explicit in the text. Face-to face conversations provide opportunities to infer from visual appearance and paralinguistic signals and thus inferences are also contextually based.

3.2.4.3 Resolution of anaphoric reference.

As speech usually comprises more than one sentence, the listener has to compute the connections between the sentences. Background knowledge, both linguistic and world knowledge help us to achieve this, in particular, by helping connect the new information with what has been said before. This is referred to as anaphoric reference, when the connection is backwards to items which have been previously mentioned, and cataphoric when it refers forwards to items yet to be mentioned. Halliday and Hasan's (1976) analysis of categories of cohesion which link

sentences broke this down into: reference, substitution, ellipsis, conjunction and lexical. Sag and Hankamer (1984) distinguished between surface and deep anaphora, surface being an omission of previous linguistic forms, and deep being a linguistic replacement for a previously mentioned item. The task of the listener is to work out what these connections are through inferring backwards in the discourse. Whilst sometimes this is straightforward e.g., *'Sue is getting married on Saturday. She is wearing pink'*, it is easy to infer that *'she'* is *'Sue'*. However, when the connection is not clear the listener has to invoke background or world knowledge to disambiguate. Research has uncovered two sets of strategies which listeners use to unravel the connections, those which use the meanings of the words and their syntactic value in the sentence, and those which use the importance of the propositions in the evolving message.

Strategies which use word meanings to unravel the connections are gender connections through pronouns (Garnham, Oakhill and Cruttenden, 1992) and through the position of pronouns in the utterance, where it is usual to refer the pronoun back to its nearest referent. Sandford and Garrod (1981) show that pronoun resolution is quicker when their referent was foregrounded in the conversation.

3.2.4.4 Construction-integration model of comprehension.

Kintsch (1988) and van Dijk and Kintsch (1983) provide a model of how texts are understood, represented in working memory and added to our general knowledge. This model has received a lot of attention. This involves the creation

of a microstructure and a macrostructure of the text. Harley (1995, p.234) describes these as "The microstructure is the network of connected propositions. .... The macrostructure concerns the higher level of description and the processes operating upon that." They assume we cannot process all the ideas in a text at once and that we handle 6 to 12 propositions in processing cycles. These are stored in working memory and connections between them noted. If there is no obvious connection to be made the more intensive process of inferring takes place. The propositions which are selected for working memory are likely to be those which are most important and those which are most recent. Inferences are thought to be integrated and stored along with the explicit proposition and to be indistinguishable from the proposition. So in each cycle of propositions we select the high-level propositions, store them longer and elaborate on them more. These stored propositions help comprehension of newly selected ones. World knowledge, schemata and scripts come into play at the macrostructure, where they are retrieved from long-term memory. The macrorules are believed to delete propositions, create inferences to fill in any gaps needed to comprehend from knowledge stores and summarise the propositions. Harley comments on this model " Kintsch's propositional network plus schema model is currently the best worked out, but it is too early to say that it is the correct approach" (1995, p.241).

3.3 Factors affecting second language listening comprehension.

The section above provided a brief overview of the interlinked, internal processes believed to underpin L1 listening comprehension. This section describes the factors which research has shown affect listening in a second language. It follows the influential framework for describing such factors proposed by Rubin (1994). Her framework has these five categories:

- Texts
- Speakers
- Tasks
- Listeners
- Processes

3.3.1 The characteristics of texts and L2 listening comprehension.

This section describes the characteristics of listening texts which affect listening comprehension in English as second language. The characteristics of spoken English which have been shown to affect comprehension are: speech rate, pauses, acoustic variables and syntactic variables.

3.3.1.1 Speech rate and L2 listening comprehension.

Learners of English often remark that one of the main obstacles to

comprehension is that speech is too fast. Although

> ... it is possible that speed of delivery is an *effect* of difficulty in comprehension, not a cause, i.e., non-native speakers have problems understanding and, therefore, perceive speech as fast, even though objectively it is not. (Flowerdew 1994, p. 22)

There have been a variety of studies on the effect of the rate of speech on comprehension: Conrad (1989), Griffiths (1990, 1991), Blau (1990), Derwing (1990), Radar (1991 cited in Zhao, 1997) and Zhao (1997) reaching different conclusions about whether or not the rate of speech affects comprehension. Blau (1990) found that spoken texts which were reduced in speed from 170 words per minute (wpm) to 145 wpm did not result in groups of Polish or Puerto Rican listeners comprehending more, except for those at very low proficiency levels. Her pedagogic conclusion was that "... we should not be overly concerned with speed of speech. ...except at the lowest levels of L2 proficiency" (1990, pp. 752). Radar (1991, cited in Zhao 1997) and Derwing (1990) also found that reducing the word rate of texts did not increase comprehension.

Other studies have reached the opposite conclusion. Conrad (1989) found that listening comprehension of NNSs was negatively affected by a faster speech-rate and that NNSs ".. seemed to demonstrate a tendency to decode the input verbatim" (1989, pp.13). Likewise, Griffiths (1990) demonstrated that, at least for lower intermediate students, a higher speech rate of 220 wpm led to a decrease in comprehension. There was however no significant difference in levels of comprehension between rates of 100 wpm and 150 wpm. He repeated the

experiment in 1991, using stories rather than sentences, and found a more significant difference in comprehension between slow and fast rates. Goh (1997), in a study using L2 learner diaries focusing on their listening comprehension development, found 'fast speech' problems mentioned throughout.

In a study which has implications for multimedia-based listening applications, Zhao (1997) examined the effect on comprehension of allowing learners themselves to control the speech rates of input texts delivered by computer. This study too found that a slower wpm rate led to greater comprehension. Subjects' self-report questionnaires confirmed that they were aware of the gains afforded by a slower wpm. Zhao hypothesised that those studies which did not find increased comprehension did not do so because speeds did match individual's internal optimum rates. Zhao summarised the study.

> First, the students changed the speech rate when given control. Second, in controlled situations, the students achieved better comprehension than in non-controlled situations. Finally, all participants reacted positively to the use of computers to control speech rate. (1997, pp. 60)

Cauldwell (1996) and Liu (1998) have proposed that the problems for learners of 'fast speech' have been neglected in L2 pedagogy. Cauldwell (1996) believes that:

> The assumption that perception will be aided by correct interpretation of the context ... or that perception is not necessary because contextual clues point so clearly to the speaker's meaning. (1996, p. 522)

is erroneous and has evolved because teachers believe that fast speech rules cannot be taught. Liu's (1998) research reported that L2 listeners noted lack of

vocabulary and problems with the linking and reduction of sounds as their most pressing concerns.

3.3.1.2 The effect of pauses on L2 listening comprehension.

Research into the effects of the frequency of pauses in spoken texts has shown that such phenomenon have a positive effect on comprehension e.g., Blau (1990), Dunkel (1988), and Berquist (1997). Dunkel (1988) found that pauses aided the quantity of note-taking which resulted from lectures. Blau (1990) found that the inclusion of pauses in texts facilitated greater comprehension than did a reduction in the rate of speech. Additionally, those pauses which were filled with 'er' and 'umm' etc. had a greater effect than blank pauses. She concludes:

> Pauses at constituent boundaries, on the other hand, do enhance the comprehensibility of aural input significantly. The use of pauses is a modification to input that is easy to implement and has the potential to significantly help NNSs receive the CI (comprehensible input) they need to successfully acquire a second language. (1990, p. 752)

More recently, Berquist (1997) reported his study which compared the effect on comprehension of hearing (1) speech at normal speed, (2) speech at slowed rate and (3) normal-speed speech with pauses inserted. The third condition facilitated greater comprehension. That pauses have been consistently demonstrated to provide greater comprehension has implications for multimedia, where learners can be given control of input and initiate their own pauses to facilitate their comprehension when needed.

3.3.1.3 The acoustic variables of spoken texts and L2 listening comprehension – the perception of stressed syllables.

The segmentation of words in continuous speech is essential for comprehension, yet the lexical boundaries of words are blurred in all languages. Word recognition comes about from a combination of the perceptual processes outlined above in section 3.2, together with use of the context and the situation surrounding the speech. Recent research on the boundaries of words in English has shown the extent to which words are embedded within others. Cutler (1997a), using the MARSEC spoken corpus, has calculated that as many as 85% of polysyllabic items in English contain embedded words e.g., '*bracing*', has '*brace*', '*race*", '*ace*', '*racing*' and '*sing*'. Research also showed that there is a large amount of between word embedding, e.g., in '*against England*' there is '*sting*'. She calculates that this feature of continuous spoken English means that about every one and a half seconds there is a word available to the listener, as signalled in phonetic terms, which is not meant by the speaker. Cutler et al. (1986) see that the detection strategies needed to deal with such embedding are specific to individual languages. It appears that L2 listeners transfer their L1 strategies, causing decoding problems in the L2.

Speech has a characteristic patterning which provides the 'metrical templates' that enable listeners to recognise what they hear. Different languages have different metrical templates i.e., English is predominantly trochaic (strong syllable followed by weak), whereas French is iambic (weak-strong). It appears that

speech perception strategies which are successfully used in L1, are transferred to L2, at least in the initial stages, and this inhibits L2 speech perception. Cutler and Butterfield (1992) and Cutler (1997b) demonstrated that, in English, the main segmentation strategy is likely to be "stress-based segmentation". Listeners focus on the recognition of the stressed syllables which typically occur on the first syllable of the main information bearing words. Delabatie and Bradley (1995) found such strategies were transferred by French speakers comprehending English. Dupoux et al. (1997) demonstrated that Spanish listeners, who also differentiate words in their L1 through stress recognition, are more proficient at discriminating stress placement in nonsense strings than were French listeners, whose own language does not exploit stress in such a way. Vanderplank (1993, p.32) has argued that stress and rhythmic patterning are more important factors which affect the difficulty of understanding any spoken English text, than are the number of words per minute.

The phonetic composition of a learner's L1 will also affect their ability to perceive sounds in English. If certain sounds are not present in the L1 then there will be initial difficulties in recognising them in English. Tomatis (1977, cited in Kelly, 1991) sees francophones as having a sound discrimination problem as French sounds fall within a narrow frequency range. For example, their perception of the phonemes /h/ and /θ / is problematic. Likewise, Miyawaki (1975) demonstrated that Japanese and Korean learners of English found difficulty in distinguishing between the phonemes /r/ and /l/, ones not found in their languages.

3.3.1.4 The acoustic variables of spoken texts and L2 listening comprehension - the perception of intonation patterns.

There is much debate about the communicative significance of intonation. One view, simplified here, is that of Brazil (1983, 1985) which sees speech, as structured around "tone units" (Brazil, 1983), which have an average size of 6 words. These tone units are separated by slight pauses, although boundaries may be "fuzzy", and have a "prominence" as their focus. Tone units are seen as having either two prominences, named the "onset" and "tonic", or just one prominence, the "tonic". Brazil (1983, 1985) sees communicative meanings as conveyed through the choice of pitch at two places in the tone unit. These are on the "key" or onset syllable, and on the "termination", which occurs after the tonic syllable, but before the end of the tone unit. He identifies three pitch choices: the "r" or rising tones, "p" or proclaiming (falling) tones, and the level or oblique tones, which involve no pitch change. Use of "r" tones is associated with shared knowledge and common ground, information that is already within the speaker - listener domain. Proclaiming tones, or a falling intonation, is used for presenting new information. Level tones indicate that the speaker is focusing on the language she is using, rather than the message. The significance of intonation appears to be a problem for NNSs of English. Cook (1991, p. 36) reports three such studies which confirm this and Kenworthy (1990) uses many cross-language comparative studies to indicate the types of intonational problems likely to be experienced by those with different L1s.

3.3.1.5 Text modifications and L2 listening comprehension.

Modifications of the input texts in various ways have been shown to increase comprehension. Studies involving changes of the syntax of input, i.e., Chaudron (1983), adding redundancy i.e., Chiang and Dunkel (1992), and including explicit discourse markers Chaudron and Richards (1986) and Dunkel and Davies (1994), have all been shown to be of benefit. It was not envisaged that this study would use modified texts as there are more powerful pedagogic arguments (discussed in 3.4.2.1, below) for the use of authentic texts.

3.3.2 Types of spoken texts and L2 listening comprehension.

Studies have investigated how a variety of factors associated with types of spoken texts affect listening comprehension. This review covers: different types of texts e.g., news or narrative texts; the content of spoken texts; the effects of the amount of visual support, including the use of video as opposed to audio only texts; and the effects of subtitles. The studies of the effects of video and subtitles on comprehension will be reported in depth as they relate directly to multimedia delivery.

3.3.2.1 Different types of spoken texts and L2 listening comprehension.

Shohamy and Inbar (1992), approaching the issue of text type and

comprehension difficulty from the point of view of language testing, found the following order of difficulty for types of texts: news broadcasts; lecturettes; and least difficult, a consultative dialogue. Brown et al. (1990, cited in Rubin J. 1994) demonstrated that narrative texts were easier to listen to and recall than expository texts. Further work by Brown (1995) showed that the difficulty of listening texts is affected by their content. She lists five factors which act to increase the difficulty of listening texts, (1) amount of things or people being spoken about, (2) how easily these can be distinguished in the text, (3) the representation of time and space, (4) how explicit the expressions were and (5) the accessibility of the topic.

There is some evidence e.g. Joiner (1997, pp.86-87) that digital sound is easier to comprehend than analog sound. As a multimedia developer she was involved in the transcription of video and found that in some cases words on a video tape were incomprehensible to up to nine native speakers. However, when the video was transferred to videodisk these became clear.

3.3.2.2 Video texts and L2 listening comprehension.

Early research into the effect of the video image centred around the effects of educational television on young NSs. For example, Vern n (1953) found that a visible speaker enhanced aural comprehension. In contrast though, later work e.g., Donaldson (1976), Fisher (1984) and Gunter (1980) found that the use of visual imagery may hinder the comprehension of audio texts because, at least in

children, the visual processing mode is dominant and thus attention to visuals may override attention to sound. This finding concurs with the work into the use of subtitles i.e., d'Ydewalle, et al. (1987), reviewed below. Gunter (1980) used three delivery formats: i) a "talking head", ii) a "talking head" plus still pictures, and iii) a talking head" with moving images. He found that greater comprehension occurred with the talking head alone, implying that a moving image interfered with audio processing. In an article citing much of this research, MacWilliam (1986) challenges the idea that the use of video for L2 listening comprehension is necessarily going to automatically and beneficially contribute to comprehension. He recommends the use of short clips of no more than 6 minutes. Grimes (1990), working in L1, found that attention and memory of video texts were greatest when there was a high degree of correspondence and semantic match between the audio and video channels. In contrast both faculties were impaired when there was no semantic match between the two channels. Given this, it may be that increased visual illustration, movement, cut-aways etc. has a detrimental effect on aural comprehension and that it is the degree of match between the sound and picture which is important.

Research into the effects of video on L2 learning has investigated its relationship to listening comprehension, to the development of the reading, writing and speaking skills, and also to the learning of grammar and vocabulary. Studies that have been carried out with L2 learners seem to indicate that the use of visual support materials do enhance comprehension. Mueller (1980) found that simple line drawings supported comprehension of recorded interviews, but that the

usefulness of the visual aids declined in relation to increased language proficiency.

Rubin (1990, in Rubin 1994, pp. 204-205) found that the listening comprehension of late-beginner students of Spanish, who used dramas shown on video, improved significantly over a group of other students who had received no video support. She argues that "... video can serve as a haven to enhance listening comprehension if it is selected so that it provides sufficient clues for information processing. It is the selection that is critical, not just the use of video alone" (1990, p.205).

Ramsey (1991) used the *French in Action* video series to investigate its impact on the learning of grammar. She used college students, with one group following this video-based course, and the other a traditional course. All video viewing was done outside the classroom. She found a positive effect for the use of video on development of grammatical knowledge.

Secules et al. (1992) investigated the use of video for listening comprehension on university students of French. An experimental group used video plus traditional classroom exercises, and the control group used the same traditional direct method classroom activities, but without the video. The length of the study was an academic term. The experimental group scored higher on listening comprehension tests than did the control group in the three areas of: main ideas, understanding details, and inference. They conclude " Students in the video-based curriculum clearly had better listening comprehension than did students in

the traditional curriculum, on all levels of analysis, for all classes" (1992, p.486). In a follow up experiment to investigate the learning of specific grammatical structures through the use of a video-based and non-video curriculum, no differences were found between the two groups. They explain their results of the video-based curriculum as follows:

> .. students gained valuable practice at the specific skill of making sense of oral material "on-line" without understanding every word or grammatical usage .....the richness of the video representation of the story (i.e., the visual action and interaction surrounding the language) is useful in supporting this on-line processing. (1992, p.486)

Herron et al. (1995) compared the effects of video-based instruction with that of a traditional text and audio syllabus, over the period of a year, and with a sample of twenty eight undergraduates of French. The specific aims were: i) to compare performance of the two groups over a period of a year, ii) to evaluate the development of the five skills of reading, writing, grammar, speaking and listening, and iii) to explore the differential relationships between skills for the two groups. The results showed that there were no significant differences between the groups on speaking, reading, writing or grammar. The result in the area of grammar contradicts the findings of Ramsey (1991), above. Only in one particular test of listening comprehension did the video-based group score significantly higher. That these gains in listening comprehension did not come at the expense of skill developments in reading, speaking or writing is also important.

Balatova (1994) investigated the importance of the visual clues contained in video used with Grade 8 learners of French. The first part of her study used the delivery combinations of: i) video and sound, ii) video without sound, iii) and sound without video. She measured comprehension using a multiple choice comprehension test. Her findings again support the effectiveness of video in aiding comprehension, with significantly better scores by the video and sound groups when compared to those of the sound only group. Interestingly, 69% of those who used the video with sound reported that they had enjoyed the story they watched, whereas 85% of those who only listened to the story disliked it. She summarises the research as follows:

> .. visual clues were informative and enhanced comprehension in general, but did not necessarily stimulate understanding of the text itself. Video was by far the more popular teaching tool when compared to audio, and unlike audio, it generated positive attitudes and confidence in understanding, even in the case of poor comprehension. (1994, p.520)

One study has assessed the relationship of video to the acquisition and retention of L2 vocabulary. Duquette and Painchaud (1996) studied the vocabulary learning of two groups of subjects, one using video and the other audio. One group listened to an audio tape, the other listened to the same tape but also had a video showing the actions of what was being described. They found that both treatments yielded equal gains in vocabulary, but that there were significant differences in the kinds of words that each group had gained. The audio only group had retained more "familiar words", those that had cognates in French or which occurred with a higher frequency. The video group had retained more of those vocabulary items which would not have been understood through the use

of L1 cognates. They believe such inference was probably assisted by the availability of a video illustration. These findings also beg the question as to whether different language processing strategies are used for video and for audio. They conclude that:

> ... the strategies developed by the students are different depending on whether the dialogue is accompanied by visuals or not. ... when learners can both see and hear, it seems that less attention is focused on purely linguistic cues .. when only audio is available, some internal linguistic cues, particularly if the word is a cognate, facilitate the inference of words that are not specific to the dialogue's theme and have a more general meaning. (1996, p.158)

In summary, it appears that video can have a positive and cumulative effect on the levels of comprehension attained with spoken texts. There is also evidence that the use of video for listening comprehension has a positive effect on SLA. It seems that the amount of impact that video has on comprehension depends on: how the visual image supports the aural text, how consistent the visual imagery is with the aural text, and how proficient the learners are. The studies described here suggest that video should be used in a comprehension-based multimedia application.

3.3.2.3 The effect of subtitled-video texts on L2 listening comprehension.

Studies of the effects of subtitled-video on comprehension have been undertaken by communications researchers, L2 reading researchers, and L2 comprehension researchers. There has been two main divisions of interest within this work. One

has compared combinations of the L1 and the L2 in the subtitle and video input e.g. Holobow et al. (1984) and Danan (1992), while another strand has investigated the effects of L2 subtitled-video e.g., Price (1983) and Vanderplank (1988). Within both of these lines of enquiry researchers have looked for a range of differential effects: on listening comprehension, on spoken performance, on acquisition of vocabulary, and on learners' attitudes.

3.3.2.3.(1) The effects of cross language subtitled-video on listening comprehension.

Research into the effects of cross-language subtitling on second language learning involves using combinations of L1 and L2 in the audio and subtitles. Lambert, Boehler and Sidoti (1981) found that pupils who had received only one form of L2 input, either written or spoken, fared considerably less well on comprehension post-tests than did those subjects who had received combinations of input. Least impact on comprehension came from the standard form of subtitling, as used by foreign films, where the audio track was in L2 and the subtitles in L1. They concluded that these have a negative effect by distracting viewers and preventing them from processing the L2 aural input. The most promising combination seemed to be reversed subtitling, where the soundtrack was in the L1 and the written subtitles in L2. There were however positive effects of L2 subtitling with L2 aural input as well. They suggested that this was due to subjects' dominant and automatic L1 language processing faculties addressing the more transient audio input, which in turn freed up more cognitive processing for

the L2 subtitles. In addition, any smooth L1 interpretation of the audio channel should provide a wealth of contextual evidence which would facilitate more effective L2 reading.

As a follow up to this experiment Holobow, Lambert and Sayegh (1984) studied the two input conditions which they had found to be the most promising for facilitating comprehension in the first experiment. These were reversed subtitling, L2 written subtitles and L1 aural sound track, and bimodal L2 input. This study was carried out over extended periods of time. They used post-tests to measure: comprehension of the passages, understanding of the contextual meaning of the terms used in the passages, and memory of the exact forms of phrasing used in the passages. The findings reaffirmed those of the first experiment, with scores on all three tests significantly higher in the reversed subtitling group. Moreover, the bimodal input subjects also increased their scores significantly over time. The authors see the use of subtitles as "... especially promising devices for second or foreign language learning and for enhancing comprehension of verbal information" (1984, p.59).

Results of research in the area of communications science have shown that subtitles are automatically and deeply processed. d'Ydewalle, Van Rensbergen and Pollet (1987, in d'Ydewalle et al., 1991) showed that the time subjects spent reading the subtitles was not significantly different when they were exposed to L1 subtitling, which of course they did not need for comprehension being fluent L1 speakers anyway. Neither did the amount of time spent reading differ when subjects were given a version with the subtitles, but without any sound track,

thus making reading of the subtitles essential. Switching off the sound did not increase the time spent focusing upon the subtitled area. This effect was shown to be true even with Americans who are very infrequently exposed to subtitling. These results suggest that when subtitles are made available to language learners with developed reading proficiency they will be exploited automatically, even if they are unnecessary for comprehension. They also suggest that there would be no need to train learners to exploit subtitles.

Further experiments by d'Ydewalle, et al. (1991) aimed to explain subjects' spontaneous preference for subtitles. They used subtitles written in the same L1 language as the sound track. Using data recorded from an eye-movement-registration-system, they concluded that reading of subtitles was not due to habit formation, as Americans who were not normally accustomed to viewing subtitled TV or films, spent considerable time reading subtitles. Likewise, Dutch speakers spent considerable time reading subtitles of a Dutch movie and the authors believe that this strategy was preferred "... because of efficiency in following and understanding the movie" (1991, p.650) and was due to "... the more dominant processing of the visual modality" (1991, p.650). It appears that reading subtitles may be an automatic activity that occurs as the result of the cognitive priority of visual, rather than oral, input. They conclude that:

> ... reading the subtitle at its onset presentation is more or less obligatory; it is unaffected by major contextual factors such as the availability of the sound track and important episodic characteristics of action as in the plot of the movie story. (d'Ydewalle et al., 1991 p.652)

Hawkins (1988, cited in Ellis, 1994) used the same study with British undergraduates of L2 French but found that reading combined with listening to texts, both using L2, produced the highest comprehension. This finding is contrary to those reported above.

Danan (1992) investigated the effects of different subtitling conditions on vocabulary recall. She found, like Holobow, et al. (1984), that reversed subtitling produced the most favourable results, but that bimodal input also positively increased vocabulary recall. The results also showed benefits for beginners using such bimodal input which was not the case in the Holobow, et al. (1984) study. She explains the success of reversed subtitling for vocabulary recall through the way in which translation facilitates foreign language encoding and that it may help with the segmentation problems described above (Cutler 1997a) as follows:

> Students often have difficulty recognising word boundaries in the spoken language, especially if they are not familiar with some of the words. Listening to and reading the text at the same time can at least help students distinguish known from unknown. (Danan 1992, p.521)

Gains in comprehension have been achieved with combinations of L1 and L2 written and aural input. However, current second language communicative teaching pedagogy holds that increasing learners' reliance on their L1 through use of translation, while learning L2, is likely to be counter-productive. Such a reliance on L1 will ultimately inhibit implicit acquisition of L2.

3.3.2.3.(2) The effects of L2 subtitled-video on listening comprehension.

A group of studies focusing exclusively on L2 subtitles have looked at the effects on comprehension, language recall and retention. Price (1983) found that the use of subtitled-video with five hundred students from twenty different language backgrounds significantly improved performance on comprehension tests, even with only one viewing of the video.

Vanderplank (1988) studied the effect of the use of nine, hour long, BBC television programmes with English subtitles, on fifteen language learners. The subtitles used were CEEFAX, which were not word for word, but summary approximations of what was said. Indications from post-use feedback and from performance on related language activities showed language acquisition benefits. Recall and retention of language from the programs was high. Subjects indicated they found that subtitles were useful and beneficial. He also reported that learners developed strategies for exploiting the subtitles and became used to "... switching from sound to text and vice versa flexibly and according to need, others stated that they had could follow text, sound and pictures simultaneously" (1988, p.275). d'Ydewalle et al. (1991), though, maintain that this is an automatic reaction. With regard to the benefits of text supported video for listening comprehension Vanderplank suggested that subtitles:

> ... unlock television for learners who are literate in English and are at an Intermediate level or higher .... increasing the redundancy in the language and bringing down the level of ungraded, authentic language. (1988, p.278)

So, like Holobow (1984), there is an indication that subtitles are of benefit to comprehension for those who already have a certain level of L2 knowledge and skills. Although acknowledging the need for further research, he dismisses the implication that learners are in fact merely reading whilst watching a video. That the use of the reading skill affords better comprehension than the listening skill is accepted by L2 researchers e.g. Lund (1991). Vanderplank, however, believes that learners were doing more than reading and that they were matching the sounds with the text and comparing their match for correctness. He sees additional benefits for subtitles in promoting a low "affective filter" (Krashen, 1982) and for unlocking accents and dialects.

Markham (1989) investigated the effects of captioned TV upon the listening comprehension of beginner, intermediate and advanced learners of English. He used two subtitled-videos on topics which were not known to the learners. Each of the three groups viewed one with subtitles and the other without. He measured comprehension with multiple choice questions which were written using the language of the video. All three groups using the subtitles performed significantly better. He speculates that "ESL students might be able to improve their listening and reading comprehension simultaneously" (1989, p.40).

In a study aimed at discovering how subtitles were assisting comprehension, Vanderplank (1990) investigated how EFL learners exploited uni-lingual, subtitled, television programmes originally intended for the deaf. He showed groups of learners a variety of subtitled-television programmes lasting 30

minutes or more and set a variety of tasks to be completed after watching. His findings were that:

- learners' attention was drawn to new words and phrases,
- dialects and accents were made more accessible,
- complex information and humour were understood,
- learners were able to compare their own lexical and grammatical knowledge with that of authentic TV,
- subjects were able to adapt and make use of the language for their own purposes.

Such benefits provide strong arguments for the use of subtitles in language learning. Vanderplank assigns a crucial role in obtaining the outcomes listed above to "... the degree of conscious attention paid to the language used in the programmes" (1990, p.226) and concludes "... where there is a "willingness to receive" and attention given by learners to programmes as language learning resources, sub-titled television programmes can be a valuable source of comprehensible input" (1990, p.230).

Garza (1991) used target language, subtitled and authentic video with advanced learners of Russian and EFL. In his study subjects were divided into two groups per language, one with subtitles and the other one without. Following four viewings of the video, all subjects completed a multiple choice comprehension test. A subset of the learners gave post-viewing oral interviews during which they recalled and retold what they had viewed. These interviews were

transcribed and the recalled propositions were matched with those in the video. The test scores of all subjects using subtitles showed better comprehension, especially for the learners of Russian. The post-use interview results also showed that the subtitles group recalled more, and used more of the original language from the video in their accounts of what they had viewed. Subtitles then, had increased comprehension and had seemingly made the language more memorable. Garza saw five ways in which subtitles enhance language learning. These were: i) the use of the usually better developed reading skills to strengthen and develop aural comprehension, ii) making the authentic language more accessible and enjoyable, iii) allowing learners to use multiple language processing strategies, iv) increasing the memorability of the language and, v) promoting the use of this new language. He concludes that subtitles help to "... bridge the gap between the development of skills in reading comprehension and listening comprehension" (1991, p.246).

A study by Neuman and Koskinen (1992) investigated whether comprehensible input, delivered by captioned-television programmes, affected the acquisition of vocabulary and of conceptual knowledge. This study was published in the journal *Reading Research Quarterly*, which in itself illustrates that researchers are unsure as to whether the use of subtitles means that reading is the dominant process, or whether primarily it is listening which is taking place. They set out to find which word and video-related variables contributed to the learning of vocabulary, and also to discover if there was any relationship between these and proficiency level and vocabulary learning. The subjects were children in immersion programmes and the video material was of science lessons. They

picked out 90 of the most difficult words from these video lessons as target words, 10 for each week. Subjects were assigned to one of four treatment groups: captioned TV, TV without captions, reading along and listening to the sound track, and reading only. Results for the vocabulary acquisition strand of their study, which used word recognition tests and tests of the words in context sentences, showed that the captioned TV group performed consistently better. This group also recalled significantly more idea-units from the science programmes. As to which of the word or video-related factors seemed to be associated with these vocabulary gains, they found that supportive video and word-contexts most affected gains. Their third research question was whether linguistic competence affected vocabulary acquisition and results showed that the higher ability subjects made most gains. They conclude "Captioned-television appeared to provide a particularly rich language environment which enabled students to learn words incidentally through context as they developed concepts in science" (1992, p.104).

Guillory (1998) examined the effects of three different types of video captioning: no captions, full verbatim captions and keyword captions. She hypothesised that the use of keyword captions would reduce reading load and, thus, increase attention to the spoken message and promote aural comprehension. The results showed that the full subtitles group, followed by keyword and lastly, the no captions group achieved highest levels of comprehension. There was, though, no statistically significant difference in comprehension between the keyword and full-subtitles group. This led her to conclude that full subtitles may be detrimental in that "full text second language captions to authentic video encourage the learner to read the text, to the detriment of processing the linguistic message"

(p.104) and that the use of keyword captions may assist listening comprehension more than full subtitles.

The research reported above is consensual on the positive effects of subtitles as to: comprehension, recall of vocabulary and ideas, reuse of the language from input, and attitudes. Researchers seem to agree that they might best be exploited with Intermediate or higher proficiency learners. Explanations offered for these effects are:

- the primacy and automatic use of the visual channel,
- the more transient nature of aural input,
- the differential end effects of the processing of written or spoken texts,
- the interaction of the two types of input, each complementing and supplementing the other,
- the superior processing mechanisms invoked by exposure to both forms of input simultaneously.

The weight of evidence suggests that inclusion of subtitles is going to assist comprehension, positively affect motivation, and may assist in the acquisition of vocabulary and grammar.

3.3.3 The characteristics of the individual listener and L2 listening comprehension.

Research has demonstrated that among the most important individual variables affecting L2 listening comprehension ability are: proficiency level, memory and attention, and amount of background knowledge. It is perhaps axiomatic to state those more advanced learners, with a greater store of linguistic knowledge, and a more sophisticated control over this knowledge, achieve greater understanding of speech. Language proficiency level is going to be a major variable factor in all listening contexts. However, as Rubin (1994) states "It is not clear what role grammar, vocabulary, background knowledge of the culture, and knowledge of discourse processes play at different proficiency levels" (1994, p. 206). Different researchers have staked claims for the primacy of each of these language areas. For example, Kelly (1991) provides empirical data that "...lexical ignorance is the main obstacle to advancement for the foreign language learner" (1991, p.135).

Logically, success in listening comprehension will be affected by the amount of attention directed towards the input. The significant role of attention in SLA was discussed in Chapter 2 through the work of Schmidt (1990, 1994) and the role of consciousness. For successful L2 listening comprehension O'Malley et al. (1989) found that "... effective listeners seemed to be aware when they stopped attending and made an effort to redirect their attention to the task" and that "... ineffective listeners reported that when they encountered an unknown word or phrase in a listening text, they usually just stopped listening or failed to be aware of their inattention" (1989, p.428). Memory also will affect comprehension, although the

relationship is complex and not fully understood. The current view is that the human being has a limited processor and the capacity of our working memory is finite. Just and Carpenter's (1992) capacity hypothesis proposed that listeners' cognitive processes are in competition for limited processing space. When trying to understand an L1 text there is processing capacity to spare, but when listening to an L2 of which he or she has a limited knowledge, listeners need to assign more cognitive resources to the grammar and lexis.

In line with the role assigned to prior or background knowledge in assisting listening comprehension, studies have demonstrated the beneficial effects of possessing the appropriate background knowledge. Long (1989b) showed how background understanding of the topic of '*rock groups*' resulted in greater comprehension of a listening text, than it did for a text concerned with '*gold rushes*', about which subjects knew little. She also showed that subjects overcompensated for lack of '*gold rush*' schema by misapplying schema. Chiang and Dunkel (1992) included background knowledge as one of their variables and found a significant main effect on listening comprehension for prior knowledge about 'Confucianism' as opposed to 'The Amish people'. Markham and Latham (1987), using texts on Christians and Moslems, found that background knowledge similarly affected the degree of comprehension. Schmidt-Rinehart (1994) used two authentic texts and the recall protocol to measure comprehension. All subjects, regardless of proficiency level, were able to recall more about the text for which they had substantial background knowledge. She concluded with a logical pedagogic implication:

> ... that educators who advocate the use of advance organisers and other types of pre-listening exercises that activate appropriate background knowledge are making suggestions that are congruent with research results. (1994, p.185)

3.3.4 The processes of L2 listening and listening comprehension.

The investigation of the listening process is fraught with methodological difficulties as it is inside the 'black box'. However, research into different listening strategies is being keenly pursued. One important issue is whether, while processing input, listeners are using and focusing on the linguistic forms of the message, the words and grammar, or whether they are using world knowledge and focusing on the meanings in the text. This is the 'bottom-up' versus 'top-down debate'. Van Patten (1990) addressed this and found that when learners paid attention to the linguistic forms, this process interfered with their comprehension of the content. He concludes that this is:

> ...evidence that conscious attention to form in the input competes with conscious attention to meaning, and, by extension, that only when input is easily understood can learners attend to form as part of the intake process. (1990, p. 296)

Bacon (1992) was not able to replicate these results and her study found that, in fact, learners adjusted their strategies according to the difficulty of the texts. With topics which were unfamiliar, subjects relied more heavily on 'bottom-up' processing. She summarises this as "When faced with faster speech and a less salient topic, they responded by retreating into much less cognitively demanding processing strategies" (1992, p. 408).

Research into the use of different strategies used by listeners has focused on cognitive and metacognitive strategies. Cognitive strategies are those which "... involve solving learning problems by considering how to store and retrieve information. Metacognitive strategies involve planning, monitoring, and evaluating comprehension" (Rubin 1994, p.211). An introspective study by O'Malley et al. (1989b) differentiated the strategies used by effective and ineffective intermediate level listeners. They found three strategies which were regularly used by effective listeners:

- self-monitoring of comprehension, whereby listeners were checking their understanding and their output while it was taking place;
- elaboration, relating new information to previous knowledge and to any new information;
- inferencing, guessing strategies to fill-in gaps in comprehension caused by insufficient linguistic knowledge.

Ineffective listeners ".. became embedded in determining the meanings of individual words" (p. 434). They concluded that the formal teaching of listening strategies should benefit ineffective listeners. Vogely (1995) came to a similar conclusion after a study investigating learners' perceptions of their own use of listening strategies. She demonstrated that although learners were aware of effective listening strategies, i.e., using background knowledge, they did not report that they had actually used them to assist their comprehension. She concluded that "... although students display the required knowledge and skills to

listen and learn effectively, they either do not know when to use them or do not know how to use them" (1995, p. 54).

Vandergrift (1996) investigated the different listening strategies used by learners at different levels. Beginners relied mainly on semantic clues, cognates, kinesics, and tone of voice, together with cognitive strategies such as, elaboration and inferencing. Intermediate listeners used more metacognitive strategies, but were mostly reliant on similar cognitive strategies, although they were able to process larger amounts of text. The main characteristic of successful listeners was the use of more metacognitive strategies:

> ... the higher the course level, the greater the metacognitive strategy use. It appears that as students advance in their language learning they become more sophisticated listeners, developing a greater repertoire of different strategies to deploy as necessary in different listening tasks and contexts. (Vandergrift 1996, p.215)

In a later study Vandergrift (1997) looked at the effective use of strategies by listeners engaged in interactive listening. He sees these strategies as being useful in resolving comprehension problems and thus in facilitating SLA. The research generated a taxonomy of six types of interactive reception strategies. These were: reprise (asking for repetition), specific reprise (asking about a fragment of language that was not understood), hypothesis testing (asking specific questions to test out whether or not the message has been correctly understood), use of kinesics or paralinguistic signals; uptaking (use of kinesic or paralinguistic signals to indicate that the speaker should continue), and faking (avoiding sending any

signals that would show they have not understood). He summarised the differences between proficiency levels as:

> A number of distinct strategies were identified. Students with novice level proficiency made greater use of kinetics, global reprises, and hypothesis testing in English in order to clarify meaning or solicit further input. Students with intermediate-level proficiency also used these strategies, but less frequently and in qualitatively different ways. In addition they also used the strategy of uptaking. (1997, p.494)

He recommends that interactive reception strategy training be a part of instructed language learning and suggests this may be done by:

- teaching appropriate phrases e.g., "I am sorry I am lost",
- using videos to discuss appropriate strategies,
- through role-play type situations which necessitate the use of such strategies as well as encouraging the negotiation of meaning.

3.4 The pedagogic approach to the development of second language listening comprehension.

Chapter 2 described the important role of interactive comprehension in SLA. This chapter has extended these ideas into the field of listening comprehension and has described the nature of the listening process and the factors which affect L2 listening comprehension. Together these ideas have influenced the pedagogic

approach to the development of L2 listening comprehension. There have been key studies devoted entirely to approaches to the teaching of listening, e.g.; Ur (1984), Anderson and Lynch (1988), Underwood (1989), Rost (1990) and Mendelsohn and Rubin (1995). There are many skills books with cassettes to be used as supplementary materials for L2 listening skills development e.g., Revel and Breary (1988), Richards (1991). Many video-based L2 listening materials have also been developed e.g., *Central News* (1989) and *Video File* (1996). A noticeable trend is for popular EFL coursebooks to be accompanied by videos for listening comprehension, e.g., *Headway Video* (1997) and *New First Certificate Masterclass Video* (1997). This section provides an overview of the key elements in the current communicative approach to the development of L2 listening comprehension.

3.4.1 What constitutes the development of L2 listening comprehension?

The consensus on how learners gain increasing control over their L2 knowledge was described in Chapter 2. Ellis (1990) summarises how pedagogic intervention may contribute to such control:

> How then do learners achieve control? The answer lies in meaning focused instruction. This provides the conditions the learner needs to activate those procedures that are responsible for both automatizing knowledge and for compensating for lack of it. In order to develop control the learner needs to practice in 'real operating conditions'. (1990, p.192)

Rost (1990) however, is more specific about the nature of the development of the listening skill and proposes that:

> ... formal instruction in listening should aim both to present learners with increasingly challenging listening texts and pedagogic tasks and to induce the learner to resolve points of non-understanding and misunderstanding. (1990, p.153)

The intended result being to increase the amount of language the learner can process and the range of situations which can be dealt with. In addition, Rost notes that:

> ... the development of listening ability will be to some extent **quantitative**, involving increasing knowledge, and to some extent **qualitative**, involving the appropriate selection of responses ... The development of knowledge and access to recurring encounters with increasingly challenging language are both necessary conditions for the development of listening ability. (1990, pp.154-155)

He is specific about the goals of a qualitative development in listening ability and proposes a hierarchy of listening skills comprised of clusters, each headed by one important and salient skill which subsumes the others in the cluster. These are:

> Emphasising Perception:
> (1) Recognising prominence within utterances
> Emphasising interpretation:
> (2) Fomulational propositional sense for a speaker's utterance
> (3) Formulating a conceptual framework that links utterances together
> (4) Interpreting plausible intention(s) of the speaker in making the utterance
> Enacting skills:
> (5) Utilising representation of discourse to make appropriate response. (1990, pp.152-153)

Lynch, however, cautions that:

> In our current state of knowledge of language learning, it would be foolish to claim that any one of the variations of listening ... offers a quicker or more effective route to success than the others. All listening probably helps. (1988, p.64)

Pedagogic intervention to contribute to such developments will need consideration of the type of listening activities, their sequence and grading, the listening materials and the role played by feedback.

3.4.2 A consensus approach to the development of L2 listening comprehension.

The pedagogic approach to the development of L2 listening comprehension which was followed in the sixties and seventies has changed to accommodate comprehension theories and research. These have recognised the importance of the 'top-down' processes, the role of inference and background knowledge e.g., (Long 1989a, 1989b). Field (1997) however argues that recent pedagogic approaches to listening comprehension have not followed the lead of reading comprehension (e.g., Grellet, 1981) in aiming to systematically develop the subskills of L2 listening. In advocating that the listening skill be broken down into subskills, and that these be addressed individually in the classroom he says that "... in current practice we focus too much on the product of listening comprehension and too little on the process" (1997, p.117).

This section describes the approach to listening comprehension within the communicative language teaching methodology. The basic building block in the

L2 communicative language curriculum has become the 'task', e.g., Long (1985), Breen (1987), Nunan (1989), Skehan (1996), Willis and Willis (1996). Nunan defines a task as:

> ... work which involves learners in comprehending, manipulating, producing or interacting in the target language while their attention is principally focused on meaning rather than form. (1989, p.10)

In order to describe the consensus view of the listening task in communicative language learning, this account follows Candlin and Edelhoff's (1987) descriptive framework consisting of six elements of any classroom task. These are: input, setting, procedures, outcomes, monitoring and feedback. The qualitative development of listening comprehension should also enable listeners to notice new linguistic items as a prelude to incidental learning and the accumulation of implicit knowledge. Rost sums up the criteria for task validity within this approach:

> Good listening instruction is first and foremost good instruction, that is, it creates the conditions for meaningful learner involvement, outcomes, and evaluation. Good task design for listening development will likewise be first good task design: it will account in advance for variables that are likely to affect student learning. (1990, pp.170-171)

3.4.2.1 Input for L2 listening comprehension.

In consideration of what materials or input are thought to be most useful for listening development, consideration is given to linguistic content, text types and delivery method. Listening texts and accompanying tasks are used not only to

develop listening comprehension, but also as input for possible acquisition of new language. Traditionally, aural texts used for developing listening comprehension tended to be written specifically for such a purpose. Authors wrote such texts to be rich in the linguistic features, usually grammar or lexis, which they aimed to teach e.g. *Streamline* (1990).

There are, however, powerful linguistic and pedagogic arguments against the use such invented and simplified texts and the trend is now away from the use of contrived listening texts. Porter and Roberts (1981) analysed listening texts from EFL textbooks and found them to differ from real-life speech in thirteen ways, e.g., too much information, clear enunciation, distinct turn-taking and structural repetition were all features of such texts. Sinclair's (1988, 1991) corpus-based work in examining natural language from the Cobuild database, and the results showing that collocation and idioms were more prevalent than might have been thought leads him to comment:

> ... there has been for many years in English teaching a loss of respect for the natural patterns of a language .. teachers have got in the way of accepting all sorts of invented or adapted texts .. there is no virtue in them. (Renouf and Sinclair, 1988, p.144)

Willis (1990) too, says of the language used in the classroom "If we are to study language in use then we must study real language designed to serve some communicative purpose" (1990, p.12). Underwood (198 , p.100) concludes that it is authentic listening material which provides "... a true representation of real, spontaneous speech ... which will make them (listeners) more able to cope with

'real life' speech when they meet it outside the learning situation" and she advocates its use from early stages.

Rost (1990) also sees pedagogic arguments against using simplified listening materials. He believes it deprives listeners of the challenge of making sense of difficult language, and that by removing culturally rich features of the language we undermine the process of student enquiry, "... if learners are being shielded systematically from those very cultural features that they are seeking to explore, we are indeed short-circuiting the entire education process" (1990, p.162). The consensus is in favour of using listening texts which are authentic and not created especially for the purpose of the classroom.

Listening occurs as a part of either a collaborative discourse or a transactional discourse, such as listening to the radio or announcements in airports, where the listener is unable to affect the input. Classroom tasks to develop listening comprehension have traditionally focused on transactional discourse, with collaborative discourse developed in conjunction with spoken practice. Anderson and Lynch (1988) see listening to transactional discourse as being more demanding and therefore needing more development.

3.4.2.2 The use of video for L2 listening comprehension.

The selection of types of aural texts should be matched to the learners' purposes for learning the language and reflect the situations in which learners need to

perform outside the classroom. Traditionally, listening texts have been delivered by audiocassette, although the arguments for the use of video, which began in classrooms in the early eighties, are based on the replication of real-life circumstances. Many books and articles on the application of video to language learning were published in the eighties e.g.: Geddes and Sturtridge (1982), Lonergan (1984), Willis (1983), Allan (1985) and Stempleski (1989). There has been a great deal of research, described above, which ratifies the effectiveness of video for L2 listening comprehension. The pedagogic rationale for the introduction of video materials into the communicative second language classroom focuses on its advantages over audiocassettes. Firstly, it centres around the need to, and the desirability of, replicating real world experience by using authentic materials. Video technology introduces the dynamics of communicative interaction, the ability to experience all paralinguistic gestures, the speakers' sex, age, appearance, relationships, dress, mood, cultural behaviour and setting for the interaction. Video images readily put interaction in context and viewers can see if, for example, a situation is formal or informal. The video context then may help in supplying much of the schematic knowledge that is held to be essential to the inference of meaning (Long, 1989b). Additionally, there may be added help to comprehension provided by the ability to see the lip synch of speakers, and thus for learners to use the types of cues exploited by the deaf (Kellerman, 1990). It has also been assumed that video adds interest and motivation to listening comprehension e.g., Lonergan (1984), and therefore it may hold learners' attention longer than audio only (Allan, 1985). Another argument in favour of video over audio concerns the importance of the prosodic elements of "stress" and "prominence" in conveying meaning (Cutler, 1997b).

Being able to see speakers is likely to aid stress recognition. It should follow that for listening activities, the use of video, with its extra sources of information, is likely to add some of the essential comprehension enhancing dimensions to the listening context which audio only cannot provide.

3.4.2.3 Listening tasks.

The development of listening comprehension is approached through the provision of tasks which accompany the listening input. These tasks are provided to help listeners elicit the meanings contained in the texts and simulate the kinds of information transfer which occur in a natural communicative context. They aim to replicate authentic listening purposes. The provision of tasks is to support, guide, focus and assist listeners in the extraction of meanings from the texts. These need to be designed "... as aids to aural comprehension practice, directing the students' attention to 'focal points' on the tape so that they will learn to listen more effectively" (Underwood, 1989, p.4). Such comprehension support tasks are very different from the types of tasks which aim to test comprehension. The differences between those listening tasks which test comprehension and those which develop comprehension have been described by Brown (1986) and Sheerin (1987). Materials writers have been extremely inventive in devising interesting tasks to accompany listening texts e.g., Stokes (1984). In addition to tasks as questions, there are a whole range of more pro-active tasks, for example, using maps, pictures, true / false, diagrams, and labelling. Underwood (1989, p.113) lists some nineteen different types of while-listening tasks. While-listening tasks

need to be completed in real-time and thus simulate the processing conditions of real-life discourse. Any delay in tasks completion will invoke use of the listener's memory. Rost warns "... delays in completion of a task require the learner to use recall skills that are not directly related to interpreting discourse in real time" (1990, p.168).

The completion of a listening task results in an observable outcome. Outcomes are seen as a key aspect of task design because they are a "... recognisable evaluation point in a learning activity" (Rost 1990, p.168). A task outcome will allow learners (and teachers) to be able to evaluate their interpretations of listening texts and match their interpretations against those of a native speaker, contributing to a qualitative development in the listening skill. Unsuccessful outcomes may be important in listening development, as realising the causes of misinterpretation focuses attention on specific problematic linguistic forms or may highlight inappropriate use of listening strategies.

Classroom approaches to listening comprehension typically involve a sequence of tasks, epitomised by Underwood's (1989) sequence of pre-listening, while-listening and post-listening tasks. A pre-listening stage involves tasks which aim to prepare the listener by activating scripts, schemata, and both linguistic and background knowledge. Research by Teichart (1996) and Herron et al. (1998), which called such a stage the 'advance organiser', has demonstrated its value in increasing listening comprehension. This preparation eases the processing load while listening. It is also unusual to listen in real-life without any expectation as to what you are going to hear. Underwood (1989, p.112) lists eleven task types

that can be used to prepare listeners for the texts they are about to hear. Follow-up, post-listening tasks may focus around a linguistic or informational element in the text and be integrated into the development of grammar, vocabulary or of other skills.

The final issue in the use of tasks is their difficulty. This can be manipulated by alterations of : listeners' purpose, response and the support material provided (Anderson and Lynch, 1988). Windeatt (1981) demonstrated how it is possible to take a listening text and to use it with a variety of proficiency levels by adjusting the complexity of the learner's task. While-listening tasks need to reflect the nature of the text and both need to reflect the interests of listeners. The tasks need to be achievable. The external response to a task is that action which is required of the listener, however the accompanying internal response needs to replicate that of a real-life listener, e.g., understanding of the essential meanings in the text. Nunan (1989) sees a continuum of difficulty of learner response to tasks, going from a task which needs no response, through to ones needing listening with understanding in order to solve a problem using the information. The final element in shaping listening task difficulty is the type and amount of any support material provided to accompany the task. This may be illustrations, diagrams, photographs, grids, maps etc. The aim of such support material is "... the result of a growing concern with helping learners to focus their attention on the relevant information in the recorded text rather than distracting their attention with potentially confusing information" (Anderson and Lynch, 1988, p.90).

3.4.2.4 The role of task feedback in listening comprehension.

The use of listening tasks with outcomes allows feedback to the listener on their task success. Rost (1990) sees feedback as "... an explicit highlighting of what has been learned ... a critical stage of any learning activity since it formalises what type of learning is expected" (1990, p.170). It allows listeners to compare their achievement as matched against native-speaker interpretations and develops understanding of why they were, or were not, successful. Feedback on task success needs to be immediate, if not, "... much of the value of discussing why students have missed things or made errors is lost" Underwood (1989, p.73). The importance of feedback in helping learners 'notice the gap' between their L2 knowledge and control over the knowledge during interactive discourse was highlighted in the previous chapter. However, the logistics of listening tasks undertaken in a classroom setting mean that feedback to all task components is traditionally given at the end of the listening text, perhaps not the most beneficial time.

3.4.2.5 Task settings and roles in autonomous listening comprehension.

Task settings refers to how listeners are grouped and roles refers to who is controlling the information flow in the task. Rost (1990) believes that task design should ask "Are there possibilities for learners to gain this control?"

> .. these questions are critical since it would appear that the creation of active information-controlling roles for learners in listening activities helps to create a balance among the interactive aspects of listening performance. (pp.164-165)

The use of language laboratories for listening tasks, where listeners control the listening text, is one way of creating such conditions.

Self-instruction in listening skills is another way in which listeners can control the setting and their roles. How then might autonomous listening comprehension development be nurtured? Self-instruction may be able to play a vital role in the development of listening skills and can be differentiated from an approach that merely encourages learners to listen more. Rost (1990, p. 234) believes "... self-instruction can play a vital complementary role to classroom instruction" and he outlines how this might best be achieved. He maintains that an instructor is still necessary for autonomous L2 listening and their role is to: select and adapt appropriate materials with tasks, plan goals, promote effective strategies, keep records and provide feedback.

3.4.2.6 L2 listening comprehension tasks and SLA.

In addition to the qualitative development of the listening skill, the use of meaning- focused tasks would also aim to facilitate incremental gains in language knowledge. The role of comprehensible input as primary source data for acquisition has been extensively discussed in Chapter 2, and this can, of course, be supplied through texts used for listening tasks. This type of input is likely to be that which is neither completely unintelligible, nor completely comprehended.

The use of tasks which are designed to increase comprehension of input should also function to increase listeners' access to new linguistic items, as a first step towards intake of this knowledge. The process of comprehension of L2 input is distinct from, but overlapping with, the process of acquiring implicit L2 knowledge. It has been hypothesised that when non-comprehension occurs, listeners are likely to notice those linguistic forms which have caused the comprehension breakdown e.g., Swain and Lapkin (1995). They may thus perhaps recognise these linguistic gaps in their interlanguage system and may subsequently add such new information to their implicit store of L2.

3.5 Multimedia and the development of L2 listening comprehension.

This section describes how the understanding of the nature of the listening process, the factors which affect comprehension when listening in L2 and the current ideas about pedagogic approaches to L2 listening comprehension provide a strong rationale for the use and advantages of deploying multimedia as an aid to L2 listening development. In addition, these ideas provide some guidelines as to how multimedia-delivered listening comprehension might best be configured.

3.5.1 Multimedia and the delivery of L2 input for listening comprehension.

Advances in computer technology now mean that multimedia can now be delivered via CD-ROM as input for practice in listening comprehension. The arguments in favour of video as L2 input are powerful i.e., Herron et al. (1995). The capacity of CD-ROM allows for 40 minutes of video as input and Digital Video Discs will be able to provide 3 hours worth of video. Access to sections of video are almost instantaneous, taking 2 or 3 seconds, unlike access to sections of audio or video tape. In self-instructed listening this may free time for learning. The audio or video can be segmented into any lengths, according to users' envisaged proficiency level. Like the language laboratory, the control of input can be placed with the learner, allowing for repetition and review of problematic input. Anderson and Lynch (1988) see listening to transactional discourse as being most problematic, this kind of listening is most suited to multimedia.

The research cited above on the use of video and subtitles e.g., Neuman and Koskinen (1992) showed increased comprehension. Unlike recorded or purchased video or audio tapes, subtitles can be included to accompany all audio and video input. The availability of subtitles should help reduce processing load and will also provide access to any linguistic features which have caused breakdowns in comprehension. The simultaneous availability of subtitles should help learners to deal with problems connected to fast speech e.g., Cutler (1997a).

3.5.2 Multimedia and the provision of L2 listening comprehension tasks.

The pedagogic task, which supports and guides listeners to the key meanings in texts, can be juxtaposed on the computer screen with the input. In all other technology the location of task and input are separated e.g., book and tape, or oht and video. This may result in efficiency of focus and heightened attention as it is easier to switch eye focus a few centimetres across a computer screen than between a book and a TV. The graphic capacity of multimedia means that it can be configured to present all nineteen task types proposed by Underwood (1989, p.113). The types of suggested materials, e.g., lists, graphs, photographs, grids and text-based questions can all be represented on-screen, in any combination, and in full colour. Listeners' responses to such tasks are also replicable with mouse and keyboard, e.g., clicking on maps, putting objects into order, gap-filling, true / false etc. On-screen tasks can be written and devised to focus on the "top-down" extraction of meaning or on "bottom-up" processes, focusing on the linguistic code. A sequence of listening tasks, pre-, while-, and post-listening (Underwood, 1989) can be configured, again with the full range of suggested tasks types (Underwood, 1989, p.112 and p.114) being fully realisable.

A key role in task-based listening development is that there should be an outcome to the listening task. The interactive nature of any multimedia environment affords provision of a visible outcome. Items can be rearranged on screen, pictures clicked on with a mouse etc. Evaluative feedback as an outcome of task completion can be provided instantaneously.

The difficulty of listening tasks was considered in relation to the purpose, response and amount of supporting material. Anderson and Lynch's (1988) ideas on how the same texts can be used with different levels of learners, providing there is manipulation of the difficulty of the task, is realisable within multimedia. The 40 minutes of video, can be juxtaposed with tasks of varying degrees of difficulty and thus extend the potential coverage to a variety of proficiency levels.

The computer is a tireless workhorse and listening software can be run endlessly. The interactive nature of multimedia software and its ability to provide tasks, receive learner reactions to those tasks via keyboard or mouse, and provide an evaluation to those responses can all be continuously reused. This is not the case for one-to-one teachers, or for paper-based materials, which need learner responses written on them.

3.5.3 Multimedia and interactive L2 listening comprehension.

In the design of a multimedia application it is possible to include resource features which will also replicate some of the characteristics of collaborative listening. These resources may provide listeners with similar kinds of opportunities which are present when listening in a face-to-face situation, i.e., the opportunities to negotiate their understanding of the input thus facilitating greater comprehension (Pica, 1994). The following features or resources can be provided to replicate collaborative listening and emulate negotiation. The fast accessibility to and precision of locating audio or video in the multimedia environment provide listeners with instant control of the L2 input. The availability of on-line

dictionaries will allow rapid access to meanings of new lexis. Subtitles to any video input allow considered access to dialogues and may help with speech perception difficulties such as word boundaries. Subtitles can include hypertext links which supply clarification of idioms, phrases or lexis. The use of interactive tasks should guide and focus listeners' attention on the meanings conveyed by the input. The feedback from tasks will confirm to listeners that their on-going understanding of the text is accurate, or that they need to realign their interpretations. In addition, this instant feedback together with subtitles should enable listeners to focus on linguistic causes of any comprehension break down. It is proposed that such processes will replicate the opportunities available in face-to-face listening which listening to audio or video cassettes cannot provide.

3.6 Summary

This chapter has provided an overview of:

- the current state of knowledge about the processes of listening comprehension,
- the factors which research has shown to affect L2 listening comprehension,
- the pedagogic approach to the development of L2 listening comprehension,
- how, in the light of the ideas from these three sections, a multimedia appication might be configured to develop L2 listening comprehension and SLA.

In order to extend this understanding of how best to configure a multimedia application to develop L2 listening comprehension and SLA the following chapter reviews the research into the effects of CALL and multimedia on aspects of L2 listening comprehension and SLA.

4. The Effects of Multimedia on SLA.

4.1 Computers and language learning.

Computer software to facilitate language learning first appeared in the early 1960's on main frame computers and began to be developed on more widely accessible computer platforms in the 1980s. Since then a variety of applications dealing with most of the language skills, have been developed, used with learners and evaluated. Books on computer assisted language learning (CALL) began to appear in the mid-eighties, for example; Higgins and Johns (1984), Kenning and Kenning (1984), Ahmad et al. (1985), Jones and Fortescue (1987), and Leech and Candlin (1986). Theoretical interest in CALL continues to grow, for example, Higgins (1996) and Pennington (1996). Academic endeavour in the field has also blossomed and there are at least two academic journals solely devoted to computers and language learning, *CALICO Journal* from the USA and *CALL Journal* in Britain. Mainstream journals such as *Foreign Language Annals, Language Learning,* and *TESOL Quarterly* also carry articles on CALL research.

Alongside the use of CALL came research into its effectiveness for SLA. Hope, Taylor and Pusack (1984, in Dunkel, P., 1991a) provided a narrative review of

the research conducted into the effectiveness of CALL up to 1984. They concluded that there were no unequivocal, positive conclusions in support of its efficacy. The research base though was small and did not include multimedia.

Robyler et al. (1988) provided a comprehensive review of the effectiveness literature in Computer Assisted Instruction (CAI), of which only three studies were in the field of CALL. They found that the research base suggested consistent effectiveness for CAI in the following areas:

- in reducing the amount of time for learning of subject matter
- students held positive attitudes to using computers and academic motivation usually improved (Kulik, Kulik and Shwab, 1986)
- the subject areas of science, mathematical and cognitive skills seemed to be those in which most beneficial learning effects were achieved
- tutorial-type courseware seemed to work for secondary students
- as a supplement to, rather than as a replacement for, teacher-based instruction in younger learners
- with no differential effects related to low, or high achievers.

However, they were pessimistic about second language instruction although they only reviewed three studies, saying "... the overall picture in studies of CAI with Spanish-speaking students suggests that CAI does not have advantages over other methods in learning English skills" (1988, p. 100).

The research base has since been greatly expanded and has provided a lot of evidence to the contrary. For example, Legenhausen and Wolff's (1990) study of the use of Storyboard, a total cloze application, found that it activated implicit and explicit linguistic knowledge. Studies by Piper (1986), Jones (1986), and Jones (1991), focusing on the language and interaction generated by computer simulations, report that these generated useful language and patterns of interaction. Cheung and Harrison (1992) found positive learning gains in program-specific lexis through use of an adventure game. Johns (1991) found that learners using a corpus could acquire linguistic knowledge and also develop their learning processes by taking the role of the "linguistic researcher" (1991, p. 2). Many studies of CALL programs for vocabulary development have also reported positive results e.g., Goodfellow (1995). The use of word processors for writing skills e.g., Piper (1987), Pennington and Brock (1992) have been shown to be beneficial, and so has the use of electronic glossaries (Leefa, 1992).

4.2 The effects of computer feedback on language learning.

One of the frequently cited advantages of CALL for SLA is the effect of computer-delivered feedback. There has been extensive work on the effect of corrective feedback on the language learning process, although there seem to be differing views as to its effects. Long (1983) sees its effect as inconclusive, whereas Ellis (1990) argues that:

> ... corrective feedback juxtaposes the interlanguage form with the target-language form, putting the learner in an ideal position to notice the difference. Such feedback serves as a way of raising the learner's consciousness about the lack of correlation between the target language and her own interlanguage.(1990, p.193)

There are, though, considerable differences between feedback in the computer environment and that provided in naturalistic settings or in the language classroom. CALL feedback is usually:

- always presented to learners,
- instantaneous,
- applies to each incorrect response,
- often provides the opportunity for the learner to correct herself,
- private.

The following studies report on the effects of computer feedback and a tabular overview of these is presented in Appendix A. The essential questions for feedback in the computer environment are: what type of feedback is seen as being most effective, which types of feedback do learners prefer, which media do learners prefer feedback in, and what do learners do with feedback once they have it? The studies described below report on these areas.

Robinson (1992) argued that perception theory and social learning theory offer important insights into the design of computer feedback. She believes that feedback which is guiding, and which leads or encourages students to be able to discover their own errors, should lead ultimately to higher achievement levels than that which only discloses errors and gives the correct answer. This she

believes will develop learners' control over their L2 performance and knowledge. She sees that implicit feedback parallels the effectiveness of face-to-face feedback and that "No, you are wrong" type feedback may have a detrimental effect on learners' self-perception. Therefore, positive feedback is to be preferred. Robinson (1988, in Robinson, 1992) compared the effectiveness of different types of feedback and found that "... internally mediated feedback led to a higher level of achievement" (1992, p.161). In summary she sees that the most desirable feedback is that which guides the student to self-correction, is not negative, places the student in control, and affords further language practice.

Nagata (1993) researched the effects of intelligent feedback on SLA, using a natural language processing system to respond to learners' written errors. Feedback was provided in the categories of: vocabulary, particle, nominal modifier, and verbal predicate errors. It took the form of instructed explanations of why the answers were wrong. This system of feedback was compared to "drill-like" feedback, which only indicated whether answers were correct, or not. Thirty-four, Japanese language students used the program with these two types of feedback. Results on an achievement test and a retention test showed a significant learning differential between the two groups in favour of the intelligent feedback group. He concluded that:

> ... traditional feedback may be as good as intelligent feedback for helping learners to correct word-level errors (e.g., vocabulary and conjugation errors) while intelligent feedback may be more helpful for understanding and correcting sentence-level errors (e.g., particle errors) which involve more complex processing of knowledge. (1993, p.337)

A follow-up study compared the effects of an intelligent feedback routine in a computer application for teaching Japanese particles and sentences with traditional workbook and grammar exercise, which used the same materials. Nagata (1996) demonstrated beneficial effects for the natural language processing based computer application for production, but not for comprehension. There have been other studies that have harnessed natural language processing routines to computer-delivered feedback, see Yang and Akahori (1998), Holland and Kaplan (1995), McEnery, Baker and Wilson (1995), all of which show beneficial effects. Intelligent feedback was not appropriate to the aims or scope of this application which focused on comprehension and not on production.

What strategies do learners use when presented with the discovery type feedback, as advocated by Robinson (1992)? Van der Linden (1993) investigated the learner strategies with computer feedback of 23 Dutch learners of French grammar. The program asked learners to rewrite sentences so that they meant the same as a model sentence. It was programmed to accept all possible correct answers and to predict between 5 and 10 incorrect versions which learners might produce. Feedback was provided on individual errors, indicating which words were incorrect. Data was collected through logs of learners' use of the program, and through the think-aloud protocols of users working with the program. They found four common learner strategies with the feedback; i) optimal - learners read and responded to the feedback, ii) classical - learners noted that their words were wrong and asked for the correct answer, iii) "once is enough" - learners attempted to answer and if they were wrong did not ask for the correct answer,

and iv) browsing - did not attempt the questions. The conclusion was that some learners did use the feedback optimally, but that learners behaved in idiosyncratic ways. The results question the proposals of Robinson that complex and explanatory feedback is always preferable. She says:

> We saw that drill-like strategy, which we initially considered to be less effective, is possibly an equally effective strategy for some students, perhaps especially the less intelligent ones. Frequent consultation of sophisticated feedback seemed, for them, to be confusing. (1993, p.65)

She concludes that "... feedback, in order to be consulted, has to be concise and precise. Long feedback (exceeding three lines) is not read and for that reason is not useful" (1993, p.65).

Which types of feedback do learners prefer? Brandl (1995) investigated high and low proficiency learners' preferences for four feedback types provided by a German CALL grammar package. The feedback types were; i) right or wrong, ii) error location, iii) grammatical description of correct response, and iv) the correct answer. Data was collected by an on-line log and by a post-use interview which focused on learners' strategic use of the different feedback options. The results showed that all subjects preferred the right or wrong feedback type. This partly corroborates Van der Linden's findings. There were no significant effects of level or of task difficulty. In their choice of follow-up feedback, having attempted their own corrections, higher-level learners used the "right / wrong" or the "error location" type, whereas low-level learners most frequently chose the "correct answer" type. The use of the "correct answer" strategy by low-level learners shows a lack of cognitive monitoring of their learning. Questionnaires

though revealed that all users appreciated the way the program allowed them to explore their errors. One possible interpretation of these preferences for "right / wrong" feedback is that this option paved the way for them to engage in a constructive re-examination of their interlanguage, and prompted them to re engage with the materials. This correlates with Swain and Lapkins' (1995) assumptions about how learners use feedback to "notice the gap" in their own linguistic performance, and the role of this in their language development. Brandl concluded that:

> .. generically stated explanations may not meet the ideal needs of each particular student nevertheless they may have a positive influence on students' reasoning processes and aggregately work to help them with their questions. (1995, p.209)

What medium should feedback be provided in? Multimedia applications now have the possibility of providing aural as well as written feedback types. Bationo (1992) investigated the effect of four different kinds of feedback on 56 undergraduates of French who used an application to teach the future indicative of regular verbs. The four types of feedback were: i) no feedback, ii) written feedback, iii) spoken feedback, and iv) written and spoken feedback. Pre-tests, immediate post-tests, and a delayed post-test, were used for data collection. The results showed that the combination of written / spoken feedback was more effective than each of the other three types for immediate recall of the material, but that there was no significant effect of feedback type on the retention tests.

4.3 Investigations into the effectiveness of multimedia for SLA.

4.3.1 Studies on the effectiveness of IVD applications for SLA.

Most of the early production and research into the use of IVD for language learning was carried out in the US military, an organisation in the vanguard of IVD developments. The ability of IVD to provide non-linear access to language learning video was of immediate interest to researchers and a tabular summary of these early research studies is presented in Appendix B. Schrupp et al. (1983, in Bush 1991, p. 109) is the earliest reported IVD study. He compared an IVD version of *Klavier en Haus* with an analogue video version for beginners' studying German. Those using the video in its interactive format achieved statistically significant superior retention of content and achievement. Verano (1987, in Bush et al. 1991) compared three ways of delivering IVD materials using *Zarabanda* with beginners learning Spanish. The permutations were: (i) a fully interactive version, where learners were in control of replay, the help options, corroborative reinforcement and comprehension checks, (ii) a linear version, and (iii) a version which bisected the two, allowing comprehension checks but no other help. He found that the fully interactive version produced higher language retention and achievement than the other two modes of use. Gale (1989, in Bush et al. 1991) used three different IVD programs with high school students of Spanish; *Montevideodisc, Macario* and *Interactive Digame.* He compared linear classroom instruction with that delivered by IVDs. Both groups used the same learning materials and he found the IVD users scored higher on

post-use achievement measures. IVD users also reported more favourable attitudes to their learning experience.

The investigation of quantifiable language gains through use of IVD was a common research aim. Crotty (1984, in Bush et al. 1991) reports superior outcomes in vocabulary and grammar learning in those using IVD for beginners' French. Brandvold *et al* (1986, in Liou 1994) conducted a study to compare the learning of groups using IVD and those not using IVD. They used a pre-test and post-test methodology and found that both of their groups had increased learning in the areas of content, vocabulary, and expression. The amount of learning was the same in all of the language areas measured, but the IVD group had better expression. Their research also reports that the IVD group was more interested in, and motivated by, the use of IVD technology.

Watts (1989) used IVD with French beginners and conducted two investigations. The first used a pre and post-use methodology to investigate learners' performance on the translation of:

- words into and out of French,
- the translation of short sentences into French,
- for the understanding of short spoken French sentences.

There were improvements in scores of 50% by the IVD group. The second study used a similar methodology and compared learners using IVD with those using identical materials, but delivered by videotapes and worksheets. Both

groups showed increases in understanding, but the IVD group made more significant gains. She notes particular gains in pronunciation for the IVD users. Her research also invited learners' opinions on the two study approaches as to: (i) which they enjoyed most, (ii) which they felt they had learnt most from, and (iii) which they thought others would most enjoy using. Learners' reactions were overwhelmingly in favour of the IVD approach. She concluded:

> Interactive video was found in this study to actively encourage student involvement in the learning process in three important ways: first, by eliciting oral responses; second, by stimulating active listening; and third by, eliminating student passivity toward the television. (1989, p.20)

A study of the socio and psycholinguistic effects of the use of IVD upon lower ability English learners by de Felix, Johnston and Schick (1990) found that such technology did, in fact, motivate the children. The study used observation rather than data but they summarise "Our initial observations indicated that the children found this form of instruction extremely interesting, particularly those video-disc images that included motion" (1990, p.184).

4.3.2 Review of the literature on the effect of multimedia applications on SLA.

As the provision of multimedia language learning is a relatively new technological option, the knowledge and research base with regard to its effects is not copious. The studies that have been completed are not homogenous. They have investigated a range of different languages, have used very different learner

types, have focused on a variety of L2 language skill and knowledge areas, and they all use different software. Much of the literature on multimedia centres around actual descriptions of multimedia software products e.g. Liou (1994), Hughes (1993) and around theoretical issues connected to the design or use of multimedia e.g. Davey et al. (1995), Laurillard (1995). The next section reports on those studies of the effects of multimedia on aspects of the SLA process that are directly related to this study. A tabular summary of these studies is presented in Appendix C. It reviews the studies of the effect of multimedia on: vocabulary, the spoken skill, and on listening comprehension.

4.3.2.1 Multimedia and vocabulary acquisition.

There are three major studies which have investigated the effects of multimedia on the learning of vocabulary. Brown (1993) used the videodisk *Riders of the Lost Arc* to investigate the learning of vocabulary. The videodisc had 33 video scenes. The learning structure was; watch a scene and go to the next one, or watch a scene and then watch it again with the subtitles. There were on-screen glosses (definitions) of certain words, and gap-filling exercises. She studied the learning of vocabulary as related to: the overall frequency of the words, the specific context (in the videodisc) word frequency, instructional focus saliency and gap in context saliency. She used a pre-test and post-test methodology to measure the learning of 150 words. These words were chosen according to four criteria. These were:

- their frequency in the Brown corpus of English,
- their frequency in the videodisk,
- whether or not they were a focus of glosses (definitions)
- inclusion in the on-screen exercises.

The results of the post-test showed that there was a relationship between the overall general frequency of the words and those that were learnt, but not between the frequency of words in the videodisc and those learnt. As for word saliency, those words with the highest gains were also those which were central to the story of Raiders of the Lost Arc. She sums up by saying that:

> General frequency does seem to make a difference in whether a word is acquired or not. Exactly how this works is not clear. Specific frequency in materials does not seem to make a difference. However, specific frequency in the social setting may. ... Words which are important (salient) in a specific context are more likely to be acquired regardless of frequency. (1993, p.281)

Liu and Reed (1995) investigated the effect of the use of video-based multimedia courseware on the learning and retention of 80 items of vocabulary. They examined vocabulary learning according to the variables of: language proficiency, computer anxiety, learning styles (field dependent and independent), and the interrelationship between the four. Their study used four, ten-minute clips of the movie Citizen Kane, repurposed for language learning. The repurposing of the videodisc highlighted twenty vocabulary items in the text, which accompanied each of the four clips of video. These vocabulary items were each linked through hypertext to:

- a definition of the word,
- its part of speech,
- some example sentences,
- its video context,
- usage of the word with synonyms and antonyms.

These were available for all 80 words in the study. A learner could choose to look at one, or all of these options. Learners first watched the clip without the text and without the linked options. The second viewing provided the text and the option to stop the video, so as to be able to consult these vocabulary learning support options, and also to do exercises using the vocabulary. Results showed a positive effect on post-test scores for vocabulary learning and for retention across all proficiency levels. They found no significant effect for learning styles. Attitudes to computers became more positive and anxiety was reduced. The study also showed that it was those with the more positive attitudes who generally had better vocabulary test scores. In conclusion, the subjects " .. not only increased their vocabulary but also improved their ability to use the words appropriately. This finding showed that the hypermedia based language learning environment was effective" (1995, p.173).

Chun and Plass (1996) investigated the effect of a multimedia reading skills application on the learning of German vocabulary. Specifically they studied; a) the incidental learning of vocabulary while subjects were engaged in reading comprehension, b) the effect of providing the different media of sound, text, pictures and video to support vocabulary learning, and c) the relationship

between the use of these learning supports and performance on a post-use vocabulary test. They found a higher rate of incidental learning of vocabulary through the reading process than they had predicted. As for the effects of the different media types, subjects recorded significantly higher scores for the learning of words that were annotated with pictures and text, as opposed to those annotated with text only, or with a video clip. This surprised the researchers who comment:

> ... words with text + picture annotations were remembered better than words with text + video annotations. This anomalous finding suggests a need for further research into how picture annotations differ from video annotation. (1996, p.194)

There was also a correlation between the amount of use of the annotations and the amount of vocabulary learnt.

4.3.2.2 The effects of multimedia applications on the L2 spoken skill.

There have been some studies on the effects of multimedia applications on the spoken skill. Meskill (1991) investigated the effects of on-line advice messages which provided information on how best to learn in the CALL environment.. These suggested the learning strategies that learners might use while exploiting an interactive video program. The interactive video was not linear, nor author-controlled with suggested optimal paths, but was open-ended and designed to be used in an exploratory fashion. Its teaching aim was the language of "disapproving" and "apologising" in English. The language learning strategies

advice suggested how learners might best "process, practice and acquire linguistic content while on-line" (1991, p.279). There were 6 types of advice messages available to learners. These were: advice to rehearse, monitor, repeat, plan, associate, and use resourcing. They appeared automatically on the screen at appropriate stages in the learner-computer interaction. There were two groups, one used a version with the messages, and another which used a version without advice messages. Learners' interactions with the computer were assessed by an observer using a paper-based checklist and learners were given an oral post-test and an attitude questionnaire. She found that learners did indeed read and attend to the advice messages, and that the weaker strategists spent more time reading the advice. There was however, no significant difference between the groups in their oral post-test performance, nor on the time they had spent on tasks, nor on their attitudes to the materials. She proposed that as multimedia language learning systems will afford a variety of learning options under the control of learners, the provision of advice on how to interact with the content and the options is one way of guiding and ensuring that learners exploit such resources to the maximum. Central to effective learning in multimedia is:

> ... the match between multimedia as a resource tool and what it is that good learning strategists *do* when provided with such resource materials becomes of key importance. (1991, p.286)

Meskill (1993) investigated the nature of the discourse of pairs of NNSs working with multimedia to create an on-line story using cartoon pictures and matching audio sequences. She compared this NNS discourse with that of NSs carrying out the same activity. The most noticeable linguistic difference between the

interactions generated by each was the lack of "... involvement markers ... those linguistic tools that serve to: (1) establish and maintain solidarity, (2) keep the channels of communication open, and (3) maintain conversational flow" (1993, p.332). She concluded that the provision of problem-solving tasks, as a stimulus for discussion via multimedia systems, might not be useful in promoting natural discourse.

Borrás and Lafayette (1994) investigated the effect of subtitled-video, delivered by multimedia courseware, on the spoken performance of undergraduates of French. The aim of the application was to develop learners' oral ability to narrate and describe. Students used a multimedia application which followed a sequence of; i) viewing authentic video with or without subtitles, ii) answering comprehension questions based on the video, iii) drafting an oral description or narration based on what they had viewed, and iv) recording this description. Data was collected from these oral descriptions, from researchers' observations, from an attitude questionnaire, and a computer log of the time spent on sections of the application. The oral descriptions were scored as to effectiveness, accuracy, organisation, and fluency. Overall significant effects for the use of subtitles were found on spoken performance. In addition, those subjects viewing with subtitles spent less time watching the video sequence than those without any subtitles. They report "... a highly positive attitude among experimental subjects toward speaking practice with multimedia ... This attitude turned out to be significantly higher for the subtitles subjects than for the no-subtitles ones" (1994, p.68). This later finding may show that those empowered with the subtitles perceive themselves as more capable of extracting the necessary input for

completion of the comprehension and oral communication tasks, corroborating Vanderplank's (1990) finding that subtitles reduce the affective filter. Particular benefits attributed to the subtitling were that they helped with associating aural and written forms through simultaneous reading and listening, making "... both the comprehension of authentic input and the production of accurate oral/written output less painful" (1994, p.71). The benefits accrued from the characteristics of the multimedia environment were that learners had control over these subtitles and could exploit them as they needed. These findings support those reported in Chapter 3 that the use of subtitles may be more useful with Intermediate learners, who have already achieved a certain level of mastery in their reading/writing skills. In summary they conclude:

> ... fully duplicating intralingual subtitles have potential value in helping the learner to not only better comprehend authentic linguistic input but also to produce comprehensible communicative output. (1994, p.69)

Another study on the effect of multimedia on spoken French was conducted by Johnstone and Milne (1995), who used *Teacher's Partner*, a multimedia videodisc on a TV-like display unit, which enabled it to be viewed by the whole class. The use of one multimedia display does not match the type of deployment envisaged in this study but several features of the software do. These were the transcripts to the video sequences, word and phrase definitions, tasks and grammatical explanations. In a year-long study with 11 and 12-year-old high school students they analysed the resulting classroom interaction generated by use of their multimedia tool. The analysis showed that the use of a teacher-controlled multimedia tool increased the use of communicative discourse in the

classroom by both teachers and pupils. They conclude "Multimedia holds considerable promise to increase the communicative character of foreign language classrooms" (1995, p. 328).

4.3.3 Multimedia and listening comprehension.

There have been two studies which have examined the use of multimedia for the testing of listening comprehension and a tabular overview of these is presented in Appendix D. Dunkel (1993) investigated the potential for using multimedia to deliver computer-adaptive listening, placement tests. Such tests are used to place learners in classes appropriate to their current skill and knowledge level. One of her concerns overlaps with the issues raised by this thesis, that of her subjects' attitudes towards using multimedia for listening. She found learners' attitudes were overwhelmingly positive towards such an innovation. They commented that it "... seemed easier and more individualised than the listening section of the TOEFL" (1991, p. 69).

Grezel and Sciarone (1994) investigated the effects of computer-based testing of listening comprehension on 352 students of Dutch as a second language. One group performed a daily listening test (n = 154), the other control group (n = 198) a daily cloze test, both on the computer, and for a period of 3 weeks. The listening test used was a traditional dictation exercise, rather than a listening comprehension exercise. It took a segment from a text that had been used in classes, learners then listened to it and were asked to type in what they had heard,

one sentence at a time. Scores of correct words were presented to the users after each sentence, with advice to repeat if scores were very low. Learners were then measured for the effects of the two instructional modes on general language proficiency via a cloze test. Significant effects were found for the computer-based listening group. Grezel and Sciarone have implemented such facilities with all groups and conclude that "The monitoring of listening comprehension development by daily testing with computers promotes second language proficiency" (1994, p.125) and that "The positive side effects of it are that it leads to better spelling and possibly improved memory capacity for L2 words" (1994, p.131).

The following are accounts of the findings of studies into multimedia and listening comprehension. Jakobsdóttir and Hooper (1995) used multimedia to assess the differential effects of text, context, and gender, on the listening comprehension and motivation of beginners in Norwegian. They found that:

> Presenting spoken language with text appeared to assist the development of listening skills. When the text was present, students made fewer errors on the subsequent comprehension test and gave higher relevance and confidence motivation ratings. (1995, p.43)

Their post-treatment tests showed significant effects for the combination of words and text, and confirm the findings reported by Borrás and Lafayette (1994), and the work outside of the multimedia environment on subtitles, reported in the previous chapter.

In a study comparing the learning of vocabulary items presented either via text plus visual, or text plus visual plus audio support, Greifnieder (1995) found no evidence "... that the program with audio support .... had any greater improvement in achievement than had the program without an audio component" (1995, p.34). The program contained 64 vocabulary items, which in one of the experimental conditions were linked to an audio file. The study was conducted with 70 high school children. There were no significant effects of improved learning of the words by those who experienced words with audio support. They explain this through the interaction of, and redundancy between, the visual and aural modes of language, as well as the superiority of the visual channel over the aural. The aural input seemed not to add anything extra to the learning that was not supplied by just seeing the word. The implication here is that the provision of different media is not beneficial for the learning of individual vocabulary items, *and it partly concurs with Chun and Plass (1996).* The methodology used in this application conflicts with the more accepted communicative approach to the teaching and learning of vocabulary. The words were presented as individual items, with no supporting context, and the subjects' task was to memorise them.

Chapter 2 proposed that multimedia would be useful for SLA as it provided an environment in which comprehensible input is facilitated through negotiated interaction between computer and learner. Negotiated interaction is likely to be facilitated by support resources such as ability to control video, translations, gist summaries, definitions etc. Liou (1997) investigated learners' exploitation of such on-line help resources in a video-based multimedia listening programme. Surprisingly, she found that "the frequency of students' use of the help devices

did not have an impact on their understanding of the video" (1997, p.91). Effective, more proficient listeners, requested less help than did ineffective listeners. There was also a difference in the type of help requested by each of the groups in that the ineffective listeners used the video rewind function significantly more than did the effective listeners. Overall, replaying of the input was used much more frequently than was any textual support resources. It appears that the subjects in this study rarely used some of the on-line help features, that use of these did not significantly increase comprehension and that she was unsure:

> ... whether learners really use optimal learning strategies or whether CALL developers implement more help than is needed. If the former is true, strategy instruction should be implemented in the courseware; if the latter is true, developers may wish to concentrate on other, more important design features. (Liou 1997, p.94)

4.3.4 Multimedia and its integration into the syllabus.

One of the rationales for the production of multimedia applications described in Chapter 2 is its ability to provide autonomous language learning opportunities. There are only three studies in the literature pertaining to the integration of CALL into the syllabus.

McCarthy (1996) reports on a large scale project at the University of Wollongong, Australia, undertaken over a period of five years, to use computer-based French grammar materials with *ab initio* undergraduates as the main vehicle for their grammar practice and for grammar testing. Grammatical items are presented in classes and followed up with a small amount of teacher-

corrected homework. After this learners use a large database of grammar items, containing between 1,000 and 8,500 items per grammatical area, to organise their own practice. Student grades in the computer tests that accompany the grammar strand of the French course are high and grammatical knowledge, which is retested over the three years but not retaught, improves. He reports that " .. feedback from students is very close to 100% positive" (1995, p.26) and that "... the integration of CALL activities into the program has established ongoing grammar review and maintenance that takes place outside of class and makes for more productive use of face-to-face teaching time" (1995, pp. 26-27). Overall this project suggests that computers can be a useful adjunct to the taught syllabus and free-up class time.

Shenouda and Wolfe (1995) in a minor study, report on their institution's use of a multimedia lab with ESL learners to supplement taught classes. The main aims were the improvement of the quality of instruction and the saving of time for learners and instructors. A study compared two groups, one had no access to the laboratory but attended regular classes, the other spent four hours each week in the lab on individualised work, set by a teacher in addition to the taught classes. Interestingly though, a pre-test post-test study showed no significant gains in any areas of language skills. They do however list eleven benefits of language study using a lab which were put forward by the instructors.

Englesberg (1997) evaluated the integration of a multimedia package into a course at Tel-Aviv University by focusing on learner attitudes. She found that initial satisfaction was high, but that after 5 weeks learners became increasingly

dissatisfied with the application. The attitude change was because students "... felt that interaction with the courseware was not helping them to achieve course goals, i.e., their ability to process pre-academic texts" (1997, p. 19). Learners were also dissatisfied with the mechanical nature of the language activities. Englesberg traces the dissatisfaction through to "... the lack of a firm theoretical basis underlying the courseware" (1997, p. 19).

Kornum (1993) described her experience in using a variety of ESL specific and English social studies CD-ROM software with schoolchildren in Denmark and reported that the technology increased student motivation and interest.

4.4 Implications of these studies.

It is very difficult to generalise from these studies, partly because of their limited number and scope, and partly because they raise serious questions about the external and internal validity of CALL research, see Chapelle and Jamieson (1991) which is discussed in Chapter 6. The studies investigated the effects of multimedia for a variety of different target languages, using different software, and based on different language input. The reasons for the use of the multimedia, the learning situations, and types of learners were also different. In addition, the aspects of the language learning process investigated and the investigative methodology used, varied considerably. Any claims based on this research, for either the transferability of any effects on various aspects of the language learning

process, or for any effects on language learning made by characteristic elements of multimedia, can only be tentative.

4.4.1 Computer feedback and the design of multimedia-delivered listening comprehension.

All studies report the benefits of on-line feedback, and some indications have been given as to the types of feedback that are desirable, effective, and preferred by learners. Feedback which guides learners in such a way that they are able to think about and to correct their own errors is seen as fitting contemporary ideas about how feedback contributes to SLA, see Swain and Lapkin (1995). However, two studies indicated that there are also reasons to value right / wrong type feedback. Learners were shown to prefer this and some learners did not use the more complex feedback. The consideration of which type of feedback should accompany real-time listening tasks poses a further dilemma. Feedback on tasks which have been unsuccessfully attempted might try to explain why the tasks have been miscomprehended, or indicate where in a listening text any miscomprehension may have arisen. However, such instant written or oral feedback to listening tasks is going to interfere with the listening process itself and distract users from the very skill they are meant to be developing. It would seem that the provision of right / wrong type feedback is the only option for tasks which accompany real-time listening input. However, to accommodate the philosophy of learner self-correction one solution may be to afford learners access to the correct answer. This might be done in two ways; firstly, through

direct access to the "correct" answer, and secondly, through provision of subtitles to enable learners to search the text for the correct answer.

4.4.2 Multimedia and its impact on SLA.

The literature review indicates how few applications and how little research has been done on the application of multimedia to listening skills. Tentatively, these studies into the effects of multimedia indicate that applications might make a positive contribution to aspects of SLA. They also indicate that there are characteristics of the multimedia environment, which if appropriately configured, may contribute to aspects of the language learning process. Increased learner control over the materials, and the non-linearity afforded by multimedia in individual sessions, has been shown to be beneficial. The extension of this, as reported in the context of CALL, is that multimedia may be a suitable means for providing learning materials which are integral to a syllabus but undertaken outside the classroom. This is a central issue in the application of multimedia in language learning and as Levy notes:

> ... if CALL is ever to be accepted by the language teaching community as a whole, CALL work must become a fully integrated component of the language teaching and language learning environment. (1997, p.200)

Lastly, the ability to juxtapose media, in particular the provision of subtitles to accompany video, has been shown to increase comprehension and affect spoken performance.

4.4.3 A lack of research into the effects of multimedia on aspects of the language learning process.

As Conrad (1996) noted, empirical CALL studies made up only 1.4% of the articles in seven mainstream and specialist journals that he reviewed. There is, therefore, little research thus far into the effect that multimedia-delivered listening practice may have.

At the time of writing, following extensive investigation, it can be claimed that so far no studies have:

1) investigated attitudes to multimedia-delivered listening comprehension,
2) investigated the formal integration of multimedia-delivered listening comprehension being used as a compulsory element of the syllabus,
3) tried to measure the effects of any components of the multimedia environment on comprehension,
4) compared the same materials delivered by multimedia as opposed to audio / videotape and pen and paper,
5) studied the long-term use of multimedia and any possible resulting language acquisition.

This study addresses knowledge potentials, in an exploratory way, in the points 1 to 5 above, and in that order.

5. A Multimedia Application for Listening Comprehension.

This chapter describes the multimedia application *Introduction to a Company* developed in the light of the research described in the previous three chapters. The first section explains the wider learning context that framed the development of the application. The second describes the learning content of the application, and the third explains how the content was configured in the multimedia environment to create the learning procedure.

5.1 The learning context.

5.1.1 Finance.

Funds were allocated to this project by the University management for three reasons. These were: to begin exploration of the learning potential of multimedia; to gain internal expertise in the creation of such material; and to eventually market the application and recoup costs. The creation of multimedia software is expensive, primarily as it involves the expertise of a multidisciplinary team of people. Brown (1991) estimated that between 50 to 217 person hours were needed per hour of learning material.

5.1.2. Development team.

The following personnel and skills are needed to produce multimedia applications to a commercial level:

- video production team - consisting of a director, cameramen, sound recordists, and video editor
- graphics designer
- computer programmer
- content specialist
- project manager

The author was responsible for the pedagogic design of the applications and for writing all the learning content. Specialists in other fields undertook the remaining developmental roles.

5.1.3. The technological specifications.

Decisions about the hardware and software specifications of CALL application are limited by the common standards available at the time. In 1994 the following hardware and software were considered standard and used for this application.

5.1.3.1 Hardware.

The application was designed to be used on hardware with the following minimum specification:-

- a 486 33 MHz computer
- 8Mb RAM
- a double speed CD-ROM drive
- an SVGA monitor
- an MCI compatible sound card

5.1.3.2 Software.

The application also needed the following software on the user's machine:-

- Windows 3.1
- Video for windows

The application was programmed using Asymetrix's Toolbook version 1.5.

5.1.4. Target learners.

The application was designed to be used by University of Wolverhampton undergraduates studying modules of Business English. The decision to focus

specifically on Business English learners was taken because, although studying in the country of the language they were learning, contact with and opportunities to practise English within a business context are non-existent. Business English modules are available at each of the three levels of ability, equivalent to the three years of an undergraduate course. The proficiency levels of each of these years is as follows:

- Level 1 - Upper-Intermediate - equivalent to a pass at Cambridge University First Certificate Exam
- Level 2 - Advanced 1 - equivalent to a pass at Cambridge Advanced English Exam
- Level 3 - Advanced 2 - equivalent to a pass at Cambridge Proficiency in English Exam

The application needed to be useful at each of these levels. These learners are mostly from Germany, France, Spain and Italy. They also already have basic computer literacy and are familiar with a mouse, the Windows Operating System and word processing.

5.1.5 Target language learning outcomes.

The application was comprehension-based and designed to:

- develop listening comprehension in the context of business English
- develop implicit knowledge
- develop explicit knowledge

5.1.6 Syllabus fit.

The application needed to supplement the University syllabus that was already used, rather than replace any of the classroom-based study elements. The application needed to be free-standing so that it could be used autonomously by learners in their own study time (Dickinson, 1987).

5.1.7. Sequence of activities.

- July 1993 - prototype developed
- September 1993 - finance agreed by University of Wolverhampton
- November 1993 - video filmed at Banks' brewery in Wolverhampton.
  - software and its functionality designed;
  - end-user specification decided

- December 1993 - content written in the following sequence:-
    - . video footage edited into 5 scenes and these divided into 3 clips each
    - . transcript of the dialogues produced
    - . learning material written
    - . hotspots written
    - . help information written
- December 1993 to March 1994 - application programmed
- March 1994 - bug testing and proof reading
- April 1994 - software title "*Introduction to a British Company*" published on CD-ROM (please see Appendix E)
- July 1995 - software title "*Managing Quality*" published on CD-ROM (see Appendix F)

5.2 Learning content.

The language learning content consisted of:

- video
- subtitles
- hotspots
- language learning tasks
- feedback
- advice on learning with the application.

The rationale behind the creation of the content in each of these six areas is described and illustrated with examples from "*Introduction to a British Company.*" The interface is shown in Figure 5.1 below.

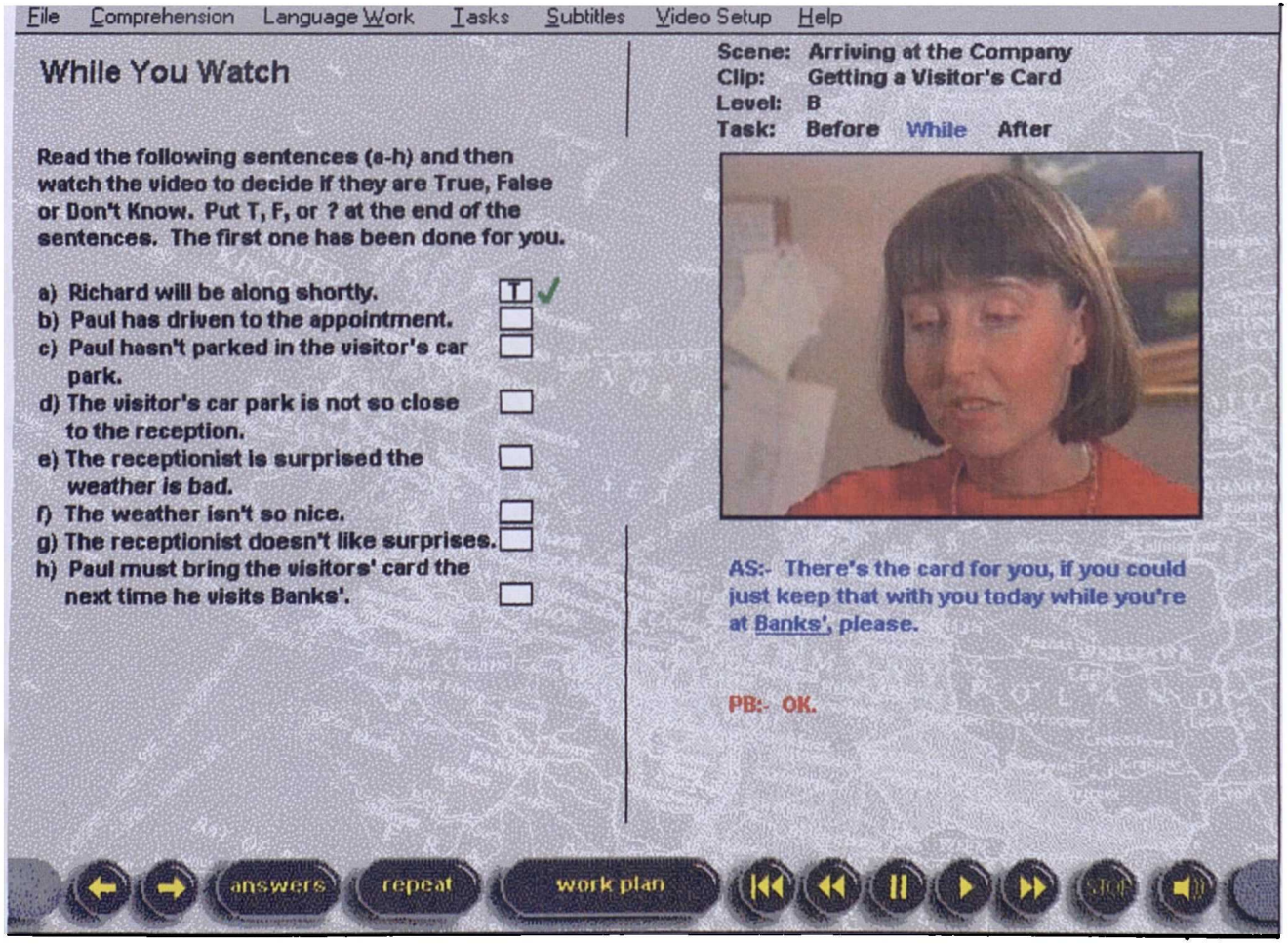


Figure 5.1 The interface of 'English for Business'

5.2.1 Video.

The research findings on the positive effects of video on comprehension e.g. Secules et al. (1992) and Balatova (1994) and on some areas of SLA e.g., vocabulary learning Duquette and Painchaud (1996) as summarised in Chapter 3, indicated that video would be the best vehicle for the language input. Given that video was to be the core input for the application, decisions had to be made about its composition, within the capacity of a CD-ROM which allows storage of up to 40 minutes of digital video.

5.2.1.1 Authentic video.

One of the key decisions that language learning materials writers have to make, when considering which texts to select for their learners to read or hear, is whether these texts will be produced for the purpose of language learning or whether to use authentic texts. Authentic texts are defined as "... any material which has not been specifically produced for the purposes of language teaching" (Nunan 1989, p.54) and as "... a text that was created to fulfil some social purpose in the language community in which it was produced" (Little et al. 1988). Underwood (1989) sees a continuum of authenticity in texts along a cline of "'authentic', 'authentic-sounding', 'semi-authentic', 'semi-scripted' and 'scripted' (1989, p.100). Authentic video was chosen because arguably authentic language is the most fruitful type of input for facilitating SLA, for developing listening

comprehension and also because it is only such texts which will adequately prepare learners for the language that they will experience outside the learning situation. Underwood (1989, p.100) lists the features which characterise authentic speech as:

- natural rhythm, intonation and pronunciation
- overlap between speakers
- spontaneous language fulfilling communicative purpose and produced in real-time by interlocutors
- normal rate of delivery (sometimes fast, sometimes slow)
- incomplete sentences, false starts, hesitations;
- background noises and, sometimes, background voices;
- natural starts and stops;
- less densely packed information than in the written language;

These, she argues, allow:

> ... students to hear a much more real act of communication with all the interactional features which are not normally found in scripted materials ... What is crucial is that students should listen to ordinary speech, spoken by ordinary people in their ordinary ways. (p.100)

Comparisons between authentic speech and spoken materials which have been written especially for the purpose of language teaching and which are delivered by actors have revealed many differences. Porter and Roberts (1981) noted some thirteen areas of difference between scripted texts and authentic speech. Among the differences exhibited by scripted texts are:

- prosodic features e.g., non-authentic spoken texts were slower in words per minute, had a wide and frequent pitch movement, excessively clear enunciation,
- language content: e.g., limited vocabulary, complete sentences ,
- discourse features: distinct turn-taking, lack of fillers (umm, err etc.), no background noise.

Local companies were approached and asked if they would allow us to video their personnel talking about their company, its business, and their jobs. The brewing company Banks' were contacted and agreed to help by providing their personnel and location. The language content of the video had to be as near to authentic as possible. This was achieved through the following procedure during the filming:-

- real personnel were filmed talking about their company, business and roles,
- an experienced teacher of business language, whose awareness of relevant topics and control of language forms would contribute to the elicitation of useful and relevant languages, acted as interviewer ,
- the topics of conversation or situations to be filmed were discussed in advance of filming to ensure these would be relevant to learners and within the experience of the subjects being filmed,
- the language would be spontaneous and not scripted or pre-rehearsed.

5.2.1.2 Topics.

The content of the video needed to be relevant to the future needs of learners of business English. The range of real-life business situations in which learners might find themselves is very wide. The project aimed to eventually develop six titles, each focusing on one business topic. To begin the series it was decided to create a general introduction to a British company and to portray this through 25 minutes of video, covering a variety of business functions performed in the company. The choice of these was partly dictated by the areas and the personnel which the company was prepared to grant access to based upon ideas we had submitted. The scenes filmed were:

- Arriving at the Company:- an interaction between the receptionist and a visitor where the visitor receives a visitor's card and is then met by the person he is visiting.
- The Managing Director:- to provide a description of the company, its products, history, current situation in the market and future directions.
- The Manufacturing Process:- to describe the product and the processes involved in its manufacture.
- The Marketing Department:- to provide an overview of the functions of the marketing section and its procedures.
- The Professionals:- an informal conversation between four employees about the nature of their business.

5.2.1.3 Interaction types.

These scenes provided coverage of factors important to listening comprehension development. There was a range of formality contained in the scenes, ranging from a very formal interview with the Managing Director to an informal chat between four employees. A range of communicative purposes was included: a description, exchange of information, question and answers, a narrative and an informal chat. There were a variety of accents: Black Country, Received Pronunciation, Welsh and North of England and both male and female speakers. There were also a variety of the numbers of speakers in the scenes. An overview is provided in Figure 5.2 below.

Scene No.	No. of speakers	Formality	Accents	Interaction type
1	3	Semi-formal	Received Pronunciation, Black Country	Greetings and information exchange
2	2	Formal	Received Pronunciation	Monologue - prompted by questions
3	2	Formal	Received Pronunciation	Narrative description
4	2	Formal	Received Pronunciation	Explanation - question and answer
5	4	Informal	Received Pronunciation, Northern, Welsh	Conversation

Figure 5.2 The number of speakers, formality, accents and interaction types in each of the five scenes

5.2.1.4 Creating the video.

The video was filmed over a period of two days. Each of the scenes was filmed at least three times to yield a greater range of spoken dialogue from which to choose the language most relevant to the learning purpose. The background settings, such as the brewing process, were also filmed so that some of the concepts, especially those connected to the manufacturing process could be illustrated with the moving image. The resulting footage was then edited by the video specialist into five scenes each lasting about 5 minutes. Bearing in mind the detrimental effects on comprehension of a lack of correspondence and semantic match between the audio and video channels, see Grimes (1990) and the beneficial effects of lip synch on speech perception, see Kellerman (1990), the finished video footage was mostly talking heads.

The following factors were considered in the choice of video. As Underwood comments "There can be no hard and fast rule about the length of a listening text for a particular level" (1989, p.103) although a survey of both published videos and supplementary listening skills for upper intermediate learners reveals that 5 minutes or less is the norm. The length of an extract is not necessarily directly related to the difficulty of understanding the text and it is likely that the longer someone talks on a topic the more chance there is of understanding the point of what she is trying to say. The average 5-minute length of each scene was also chosen to maintain learners' interest and motivation, avoid fatigue and to limit memory load (Anderson and Lynch, 1988). However, to provide opportunities

to listen to smaller sections and to provide variety, the five scenes each lasting about 5 minutes were further divided into 3 smaller clips. This gave 18 video segments around which to base the learning tasks. The scenes were divided into clips on the basis of discrete topics, enabling each to stand as a complete entity. For example, the first scene "Arriving at the Company" was divided into the three shorter clips entitled "Introductions", "Getting a Visitor's Card" and "Meeting Richard Westwood". Each contained one complete transaction.

In the selection of the video no account was taken of language forms i.e. complexities of grammar or vocabulary. The scenes and clips though needed to contain full descriptions of their topics,for examplethe first scene shows the whole transaction from arriving at the reception to being met by the host, the second scene deals with the past, present and future of the company, and the third a complete description of how beer is produced. The video was edited into a 25 minute sequence by the video production team who overlaid cut-away moving images where appropriate, to further illustrate the spoken dialogue.

5.2.2 Subtitles.

The positive effects of L2 subtitles on comprehension e.g., Garza (1991) and on areas of SLA e.g., vocabulary Neuman and Koskinen (1992) and spoken skills Borras and Lafayette (1994) were described in Chapter 3. The possible contribution of subtitles to the processes of 'negotiation of meaning' for examplePica (1994), to facilitating 'noticing' of new language, see Schmidt

(1990) and of learner errors, see Swain and Lapkin (1995) were proposed in Chapter 2. In addition, it was hypothesised that subtitles may assist in resolving difficulties in L2 speech perception outlined by Cutler (1997a) and Cauldwell (1996). The decision to used full subtitles, as opposed to keyword captions (Guillory, 1998), was taken so as to allow the full retrieval of syntax and lexis. Subtitles then were to be an integral element of the learning content. The author produced a written transcript of the selected twenty-five minutes of video. The subtitles were verbatim and included all the *umms*, *errs*, false starts, repetitions etc. The complete transcript was 3,320 words long. An example from the scene "Marketing Department" is shown in Figure 5.3 below.

Interviewer:- Fran, could you explain to me what the role of the marketing department is within such an organisation as Banks"?

Fran Hayes:- Well Paul, the role of any marketing department is very much to make sure that the products and services that are supplied by any company, are very much in tune and fulfil the needs of the consumers within the marketplace.

Int.:- Right, OK. so wha what particular marketing initiatives are you involved in then here at Banks' at the moment?

FH:- Within Banks' the role of the marketing department is really to develop all our brands to their maximum potential. Now that covers a very broad cross-section of activities ranging all the way through from uhh devising and implementing uhh advertising strategies, all the way through to product development, packaging, organising promotions, looking at pricing and also market trends as well.

Int.:- Yes, I, I've seen the the recent, uh television campaign. It's quite interesting.

FH:- They have been very successful for us.

Int:- Yes, OK, fine. I believe there are three exciting initiatives that you are involved in at the moment ?

FH:- Yeah, well, the the first is the development of Banks' Mild, uh the, its introduction to new drinkers as we see it as a product with uh very easy drinking characteristics and one with tremendous potential with a lot of people to to tell about it.

Figure 5.3 The written transcript from Scene 3, Clip 1, "The Marketing Department" which appeared as subtitles to the video.

5.2.3. Hotspots.

The positive effects of annotations on vocabulary acquisition in multimedia-based reading comprehension, see Chun and Plass (1996) and Lomika (1998) were described in Chapter 4. The author picked out words and phrases from the subtitles, which were to be hotspotted and annotated with further explanation. The four criteria that were used to select the 102 hotspotted words were:-

- business relevance e.g., *rights issue, a vertically integrated company, incorporation*
- technical terms e.g., *sparge, grist, percolate*
- idioms e.g., *to hold one's head high, a small fish in a big pond, bottom-line money*
- subjective prediction of difficulty e.g., *organic, demographics, in tune with*

The explanations included the type of word e.g., noun, adjective, phrase, adverb, verb, and a definition of the meaning as used in video context. Some examples are shown below in Fig. 5.4.

a vertically integrated company (ph).

a vertically integrated company is a type of company which owns the various stages in the production and distribution of its product. Banks' for example produces the barley, brews the beer and owns some of the pubs in which the beer is drunk.

to hold one's head high (ph).

to hold your head high means to be able to be justly proud of something.

sparge (v).

to sparge is a very unusual technical term for spraying water over something, especially used in brewing.

Figure 5.4 Three examples of hotspotted words and their annotations.

5.2.4 Learning tasks.

The application aimed to: i) develop listening comprehension, and through this ii) to facilitate implicit language learning and iii) to increase awareness of explicit language knowledge. The processes whereby learners gained increasing control of their L2 knowledge were described in Chapter 2, see McLaughlin (1989). The current pedagogic consensus on the development of listening comprehension through tasks was outlined in Chapter 3, for example Rost (1990). The process and value of the development of explicit L2 knowledge was also described in Chapter 2, see Rutherford (1988). The learning tasks were provided and configured in the light of these ideas. The application contains 242 different

screens of tasks, 162 for comprehension and 80 for language work, each containing between 5 and 20 individual elements.

5.2.4.1 Listening comprehension development.

The approach taken to the development of listening comprehension was to offer a sequential series of tasks (Underwood, 1989). These were:

- pre-watching tasks to be completed before watching the video
- while-watching tasks, which needed to completed using information from the video
- after-watching tasks that further exploited the language or the information contained in the video message.

This section discusses the learning aims of these tasks and the types of tasks that were used.

5.2.4.2 Pre-watching tasks.

Chapter 3 outlined the role played in listening comprehension by the listener and of background knowledge brought to the text, see Carrell et al. (1988). The positive effects of advance organisers on levels of comprehension and retention of information, see Herron (1998) and Teichart (1996) were outlined in Chapter 3. The pedagogic rationale for pre-watching tasks in listening comprehension

Underwood (1989) was described in Chapter 3. Underwood says that without any preparation for listening learners will not be able to:

> ... use the natural listening skills (which we all have in our native language) of matching what they hear with what they expect to hear and using their previous knowledge to make sense of it. So, before listening, students should be 'tuned-in' so that they know what to expect, both in general and for particular tasks. (1989, p.30)

Pre-watching tasks were, therefore, written for each of the video clips. The aims of these pre-watching tasks were to build up learners' expectations about what they were going to watch and experience. The nature and the content of the video texts were the main factors which affected the choice of pre-watching activity. So using the transcript of the video texts the pre-watching tasks were written to prepare learners for watching in one of these six areas:

- events
- topics
- information
- order of topics, events or information
- participants and their roles
- specific language items in the spoken text

Examples are presented below for events in Figure 5.5, order in Figure 5.6 and language in Figure 5.7.

Before you watch

Paul has arrived at reception. What do you think will happen? Put Y for Yes or N for No in the box next to each statement.

a) Paul gets a cup of tea

b) They talk about the weather

c) The receptionist asks where he has parked

d) Paul leaves his coat at reception

e) Paul gets a visitor's card

Figure 5.5 An example of a pre-watching task to prepare learners for the events which would take place in scene 1, clip 2 "Getting a visitor's card".

Before you watch.

You are going to watch Paul Brett arrive at the reception of Banks' brewery. Put these events in the order which you think they are going to happen. Put a number in the box.

a) Paul shakes hands with Richard Westwood

b) Paul gets a visitor's card

c) Paul introduces himself to Richard

d) Paul and Richard leave the reception

e) The receptionist phones Richard

f) Paul introduces himself

Figure 5.6 An example of a pre-watching task to prepare learners for the order of events in the scene "Arriving at the company"

Before you watch

Paul arrives at reception. Which two of these sentences do you think the receptionist says to Paul? Click on the sentences.

Hi, how's it going?

Good morning

Could I have your name please?

Why are you early?

What do you want?

Figure 5.7 An example of a pre-watching task to prepare learners for some of the language used in Scene 1 clip "Introductions".

5.2.4.3 While-watching tasks.

The way in which comprehension, achieved through meaning-focused instruction, is hypothesised to contribute to the development of implicit L2 knowledge, see Ellis (1990) was outlined in Chapter 2, as were the processes whereby learners gain control over their L2 knowledge, through performing under real operating conditions, see McLaughlin (1990). The task-based pedagogic approach to the development of control over L2 during listening comprehension was described in Chapter 3, see Rost (1990) and Underwood (1989). These perspectives were implemented in this application through provision of while-watching tasks which focused on the meanings of the spoken text. These were provided to be completed while learners were watching the video. The aim of tasks which

accompany listening input is to guide the listening process and to promote the extraction of the messages from the spoken texts. They assist comprehension by focusing, supporting and sustaining learners' understanding. In the application this was a two-step process. Firstly, learners needed to read the task instructions and material, and secondly to complete the tasks while they are watching and in real-time. The tasks provide listening purposes which are aimed to make listening an active process. Feedback on learners' success in these tasks was instantaneous and served to confirm whether learners' interpretations of texts were accurate.

The main consideration in designing the while-watching tasks was the nature of the communicative meanings in the spoken text. The following five listening purposes guided the writing of the while-watching tasks and three are illustrated below in Figures 5.8, 5.9, and 5.10.

- Identifying topics and / or their order
- Extracting factual information
- Allocating meanings to speakers
- Inferring meanings
- Identifying language items and / or their order

While you watch.

Richard Westwood, the Head Brewer at Banks' is going to explain the brewing process to Paul. Watch Richard explaining the process to Paul and click on these stages of the process (a - h) in their correct order.

a) The wort and hops are boiled in the coppers for an hour and a half.

b) The barley is converted to malt at the maltings.

c) The liquid is left to ferment for 6 days.

d) The malt is transported to the brewery.

e) The malt gets crushed in the mills and turns to grist.

f) The boiled grist and water are allowed to stand in the mash-tuns for an hour and a half.

g) The enzymes convert the starch into sugar.

h) the grist is mixed with water and boiled.

Figure 5.8 An example of a while-watching task that asks for identification of topics and their order.

While you watch

Read the following questions about the video. Watch the video and choose the best answer a, b, or c. Click on the best choice. The first one is done for you.

a) Paul's appointment is at a) nine thirteen.

b) one thirty.

c) half past nine.

b) Richard will come to meet Paul a) in a short while.

b) in a while.

c) in a minute.

c) Paul has come to Banks' a) by train.

b) by car.

c) on foot.

d) Paul has to a) keep the visitor's card all day.

b) give the card to Richard.

c) give it to the managing director.

e) Paul and Richard are going to see a) the marketing director.

b) the managing director.

c) the production manager.

Figure 5.9 An example of a while-watching task which asks learners to extract factual information

While you watch

Paul is arriving at Banks' Brewery. Read the words of the conversation and click on them in the order you hear them.

a) Thanks.

b) .... that you're here.

c) Right, could I ....

d) Good morning. Um I've .....

e) Hello Richard, Mr Brett from Wolverhampton University .....

f) .... got an appointment with Richard Westwood at uh 9:30.

g) Good morning.

h) ..... have your name please?

i) Paul Brett from the University of Wolverhampton.

j) Right, I'll just ....

k) .... is here to see you. Right thank you very much.

l) ... let him know ...

Figure 5.10 An example of a while-watching task that asks learners to identifying language items and their order.

5.2.4.4 After-watching tasks.

The third and final sequence of tasks were after-watching tasks. The aim of these was to develop further awareness of language forms which learners had already

experienced and understood in the communicative context of the video. The contribution of explicit L2 knowledge to SLA was detailed in Chapter 2, for vocabulary Ellis, N. (1995) and for grammar Rutherford (1987) as were possible pedagogic approaches to the development of L2 knowledge, see Ellis (1993). Development of explicit knowledge was the aim of the after-watching tasks. Underwood (1989) suggests that in the classroom the after-watching stage should, or could be, followed by further activities which are connected to, or based on, the content of the listening text. *After-watching tasks mostly focused* on linguistic forms in these four areas:

- vocabulary, synonyms, opposites, meanings
- collocations or set phrases
- grammar
- word order

An example of an after-watching task is shown in Fig 5.11, below.

After you have watched.

The following phrases are in the conversation. Match the words on the left (a-h) with the words which could follow them on the right (i-viii).

a) in a	i) visitor's card
b) write out a	ii) with you
c) I'm surprised	iii) here
d) you've managed	iv) close
e) along	v) you've
f) keep that	vi) short while
g) a space so	vii) nice
h) weather being not so	viii) to get

Figure 5.11 An example of an after-watching task which focuses on set phrases.

5.2.4.5 Graded listening comprehension tasks.

To increase the versatility of the application it was designed to develop listening comprehension of learners who were at different ability levels. Anderson and Lynch describe this approach as "... to take any listening text and compose a listening task that would be appropriately difficult for a particular group of learners at any level of proficiency" (1988, p.88). The learner levels which the application focused upon were determined by the three undergraduate levels described in section 5.1 above, and were labelled levels A, B and C. The

approach taken was to use the same core video, but to adjust the difficulty of the tasks which accompanied it. Brown and Yule (1983) suggest that these four groups of factors need to be considered when configuring the complexity of listening comprehension work:

speaker - numbers of speakers, accents, speed

listener - interest, eavesdropper or participant, required level of response

content - grammar, vocabulary, background information, information structure

support - printed text, pictures

In the context of this multimedia application, where the video input was a fixed item, the manipulation of task difficulty was achieved through adjustment to: the pre-watching tasks, the while-watching tasks and to the amount of information required in the tasks.

5.2.4.6 Manipulation of the pre-watching tasks.

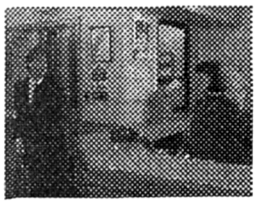
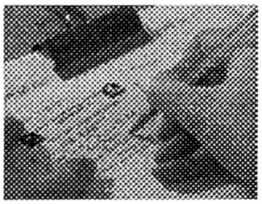
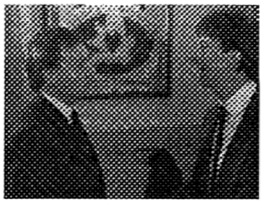
One of the factors which was adjusted to contribute to grading the difficulty of the tasks was the amount and type of information provided through completion of the pre-watching tasks. Thus, in the level A pre-watching tasks a greater amount of the content, the language which was used, or the specific information which was contained in the video were made available than was the case in the level C pre-watching tasks. An example is given below, in Figure 5.12, of the

three pre-watching tasks from levels A, B and C which accompany the same video scene "Arriving at the British Company".

Level A

Before you watch.

Paul Brett arrives at the reception of Banks' Brewery in Wolverhampton. Look at these five pictures from the video you are going to watch. Click on them in the order you think they will come.

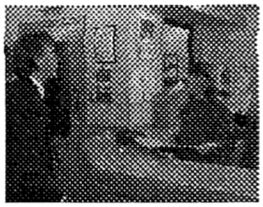


Figure 5.12 The pre-watching tasks at levels A, B and C for the video scene "Arriving at a British Company"

Level B

Before you watch

Paul arrives at Banks' reception at 9:20 for an appointment with Richard Westwood the Head Brewer. Look at these questions (a-f). Which questions do you think Paul will be asked?

a) Why are you late?

b) Could I have your name, please?

c) Where are you from?

d) Have you found somewhere to park?

e) How long are you staying?

f) Did you manage to find us OK?

Figure 5.12 (cont) The pre-watching tasks at levels A, B and C for the video scene "Arriving at a British Company"

Level C

Before you watch.

Paul arrives at the reception in Banks' brewery and meets the receptionist Allison and then meets Richard Westwood the Head Brewer.

1. Think about what happens in your country when you visit a company.
2. Read these sentences (a - h) about visiting a UK company. Decide if they are usually true or false. Put a T or F at the end of the sentence.

a) A driver always parks your car for you.

b) First you go to reception.

c) You should always be about ten minutes late.

d) The receptionist informs the person you are going to meet that you have arrived.

e) You receive an identity card from the reception.

f) You should keep this card with you during your visit to the company.

g) You wait at reception until the person you are meeting comes to meet you.

h) You will usually have to wait for half an hour for the person you are meeting.

Figure 5.12 (cont) The pre-watching tasks at levels A, B and C for the video scene "Arriving at a British Company"

The level A task presented still photos from the five key moments in the scene. These provide information about who the participants are, how many of them there will be, where the interaction takes place, the type of communications there will be (face-to-face and phone), the information that might be exchanged (names

etc.) and language which might follow from any of these events. The level B task provides the information that learners will meet three speakers and specifies the roles which each play, together with some ideas about the questions which will be asked. Listeners do not have the same amount of information about what they are going to watch as they do in the pre-watching task at level A. This level C pre-watching task focuses in a more general way on the situation, that is the learner's prediction about the usual procedure followed when arriving at the reception desk. No specific information about the actual nature of the interaction, the participants or the language has been provided.

5.2.4.7 Difficulty of the while-watching tasks.

The second variable that was manipulated to add to listening difficulty was the type of task listeners were asked to complete while they watched the video. Gerot (1987, cited in Rost, 1990) produced a continuum of question difficulty, progressing from least difficult to most difficult, on which this was based. This is shown in Fig 5.13 below.

Difficulty	*Name*	*Examples*
Least	Replicative	Answer replicates or exactly repeats the words used in the text
Least	Echoic	Answer echoes the text although it may differ lexically or grammatically
↓	Synthesis	Hearer must connect and conflate a number of bits of information
↓	Oblique	Hearer must infer a fact which follows from something mentioned explicitly in the text
Most		
	Surmise	Hearer must infer facts or ideas, but not from an explicit statement in the text
Most		

Figure 5.13 Gerot's (1987, in Rost 1990) continuum of task difficulty

The level A while-watching tasks used replicative and echoic type questions. Level B used echoic, synthesis and some oblique question types and, level C type questions used synthesis, oblique and surmise questions. An example of the three different sets of while-watching tasks which accompany the clip "Banks' position in the market" is shown below in Figure 5.14.

Level A.

While you watch

David Thompson the managing director of Banks' is going to describe the position of Banks' within the market at the moment and the current beer drinking market trends in the UK. Read the following sentences (a - g), watch the video and choose the correct option (i, ii, iii) to complete the sentence.

a) Banks' local market share is i) 16 - 17%; ii) 60 - 70%; iii) 6 - 7%

b) Banks' total distribution market share is i) 4 - 5 %, ii) 14 -15 %, iii) 40 -50 %

c) Banks' national market share is i) 20 -30% ii) 2 - 3% iii) 2/3 rd %

d) Sales of beer rose to i) 44 ii) 45 iii) 40 million barrels in 1979

e) Sales of beer have fallen to i) 45 ii) 35 iii) 25 million barrels .

f) More of the population are in the i) 35 - 55 ii) 25 -45 ii) 25 -55 age group

g) People are working harder than they were i) 20-30 ii) 50 -20 iii) 15 -20 years ago.

Figure 5.14 The while-watching tasks at levels A, B and C used to accompany the video clip "Banks' position in the market".

Level B.

While you watch.

David Thompson the managing director of Banks' is going to describe the position of Banks' within the market at the moment and the current beer drinking market trends in the UK. He tells Paul about the following topics put a number next to these topics in the order that he mentions them. The first is done.

People are drinking more at home. ___

The amount of beer sold in the UK. ___

Banks' market share. _1__

The rise of premium products. ___

People are going out less. ___

The erosion of the demand base for beer. _____

The decline of heavily advertised products. ___

Banks' national market share. ___

Banks' profit continues to grow. ___

Figure 5.14 (cont.) The while-watching tasks at levels A, B and C used to accompany the video clip "Banks' position in the market".

Level C.

While you watch.

David Thompson the managing director of Banks' is going to describe the position of Banks' within the market at the moment and the current beer drinking market trends in the UK. Read the sentences below and decide if they are true, false or don't know according to the video. Put T, F or ? at the end of the sentence.

a) Banks' are a small company in a large industry.

b) Changes in population have led to a decline in the market.

c) People drink more at home than in pubs.

d) Sales of food and soft drinks have helped maintain profits.

e) People are drinking less for health reasons.

f) It is a bigger treat to go out now than 15 years ago.

g) The trend is away from lower value products.

h) People are drinking less and drinking cheaper beers.

Figure 5.14 (cont.) The while-watching tasks at levels A, B and C used to accompany the video clip "Banks' position in the market".

The level A task is replicative, asking for recognition of exact words from the video. The level B task requires listeners to collate the information and relate it to one of the topics and is a synthesis task. The level C task asks listeners to infer meanings from ideas which are mentioned the texts and is oblique.

5.2.4.8 Adjusting the quantity of information required.

The third variable, which was manipulated to increase the level of complexity, was the amount of information which listeners were required to extract from the text. Thus level A tasks asked for less information than level C. The tasks that asked for less information also asked for fewer responses. This allows listeners more time to spend listening. An example of this is shown below in Figure 5.15.

Level A.

While you watch.

Paul is talking to Fran Hayes, a Marketing Manager at Banks'. Fran covers the following topics (a-e). Put them in the same order as he talks about them.

a) The particular role of marketing at Banks

b) Attacking the premium lager market

c) The role of the marketing department

d) Banks' Mild.

e) Cameroon's Strongarm.

Figure 5.15 The while-watching tasks at levels A, B and C which accompany the video clip "A Marketing Manager"

Level B

While you watch

Paul is talking to Fran a Marketing Manager at Banks' about his role in the company and about particular current marketing initiatives at Banks'. Watch the video and click on the answer that Fran gives (i, ii, iii) for these questions (a-f)

a) What is the role of a Marketing Department?

i) make sure products are supplied.

ii) ensure that products are in tune with customers

iii) sell more goods.

b) How has the recent television campaign been? i) terrible ii) productive iii) interesting

c) There are i) 1 ii) 2 iii) 3 new marketing thrusts at present.

d) There i) used to be ii) is iii) will be a different market for Banks' Mild.

e) Banks' i) bought ii) sold iii) are going to buy Cameroon's Brewery.

f) i) Zamek ii) Czechs iii) Banks' invented lager.

Figure 5.15 (cont.) The while-watching tasks at levels A, B and C which accompany the video clip "A Marketing Manager"

Level C

While you watch

Decide if these sentences are true or false according to Fran Hayes a Marketing Manager at Banks'. Put T, F or ? at the end of the sentence.

a) Products should fulfil the needs of the consumers.

b) Looking at the prices of the products is one of the marketing departments jobs.

c) Paul wasn't attracted by Banks' advertising campaign.

d) Fran wrote the current advertising slogan

d) New customers are being introduced to Banks' Mild.

e) Mild will out sell bitter

f) Cameroon's Strongarm is a brewery company.

g) The most dynamic sector of the market at present is premium lager.

h) Banks' have never previously imported products.

i) Zamek was introduced in 1993..

Figure 5.15 (cont.) The while-watching tasks at levels A, B and C which accompany the video clip "A Marketing Manager"

5.2.4.9 Focusing the learner on the linguistic code.

The main aim of the application was to develop listening comprehension and the video scenes and clips were chosen to further this objective. The secondary aim was to also provide an environment which might contribute to the increase of

explicit L2 knowledge. The development of explicit knowledge may be "... as a result of memorising descriptions of L2 features or of engaging in problem-solving activities" (Ellis 1997, p.130) and the multimedia environment can deliver both types of activity. Explicit knowledge for the purpose of language teaching has traditionally been segmented into grammar, vocabulary, pronunciation, and more recently, language functions.

5.2.4.3.10 Development of grammatical awareness.

The selection of grammar areas to include in the application was derived from an analysis of the grammatical items present in the video scenes and clips. This approach was taken so that through the video learners would have the opportunity to experience the grammatical items as used for an authentic communicative purpose. Although there has been considerable agreement among course writers as to what grammar areas to teach and in what order to teach them (Yalden, 1983), it is also accepted that learners' interlanguages at any given moment are made up of different sets of explicit knowledge. The following grammatical areas were selected for inclusion in the application:

Articles, Can, Conjunctions, Comparatives, Get + Past Participle, Going to, Passive, Past Simple, Prepositions (of place), Prepositions (of time), Present Continuous, Present Simple, Present Perfect (1), Present Perfect (2), Pronouns, Relative Pronouns, Some / Any, to be, Verb + ing, will

The development of grammatical understanding of these areas was based upon two pedagogic approaches. The first approach has been termed 'consciousness raising' defined by Rutherford (1987) as 'the drawing of the learners' attention to features of the target language'. This is achieved by the use of tasks which require learners to perform some kind of operation on language data and is aimed at increasing understanding of the linguistic properties of that data. Examples showing: modification, rule provision, completion, sorting, identification and judgement type consciousness-raising tasks are shown below in Figure 5.16 (A-H).

A. Modification - learners are asked to change the text in some way

Articles.

1. Look at these sentences from the video (a-k) none have articles in them. Look at the sentences and decide if an article is missing or not. Put Y or N at the end of the sentence. Where an article is missing. write it in and the word before it in the space. The first one is done for you.

a) I've got an appointment with Richard Westwood at um 9:30. *Y got an*

b) Paul Brett from University of Wolverhampton.

c) Right, could I have your name please?

d) Have you found somewhere to park?

e) I'd like us to have very brief ten minutes with our managing director David Thompson.

f) We started over hundred years ago,...

g) I think most important thing about regional brewery company...

h) Well Paul, the role of any marketing department is..

i) ..we brew traditional beer because we think that's best way of producing beer,

j) ...they try to brew traditional beers in lager plant

k) market itself however is characterised at moment by overall declines...

B. Rule provision - 1

Can.

Can and could are modal verbs. They are both followed by an infinitive and are related in meaning. Can means " I believe it is possible that..." and Could means "I believe that it is remotely possible that .....

Figure 5.16 Examples of consciousness-raising grammar tasks

C. Rule provision - 2

Some and any.

Look at the following sentences and try to work out the rule for the different use of "some" and "any". Write your rule in the box which follows. Then click on Answer to compare your rule with the computer.

They like some of our stuff.

Have you got any advice about it?

They had some very good ideas.

Some of them came very late.

You can get it at any newsagents.

That hasn't got any better since last year.

Could you give me some sugar, please?

They like any of our stuff.

(A click reveals this rule:-)

Some and any are used to refer to indefinite ideas.

Any refers to all or none - it is unlimited

Some refers to a part - it is limited.

Figure 5.16 (cont.) Examples of consciousness-raising grammar tasks

D. Completion

2. Look at these sentences from the video (a - i). Each has the numbers 1,2 and 3 in it. One of the numbers replaces a "can", decide which and click on that number. Click on the number.

a) ... so you 1 (can) imagine with about two or three percent 2 overall market share 3 nationally,

b)... and we 1 (can) convert that into higher 2 levels of profitability and greater 3 net margins.

c) ...which 1 is a bit like porridge and in fact 2 that's the smell that you 3 (can) smell now.

d)..then 1 is allowed to stand in one of the mash-tuns that you 2 (can) see behind us and it 3 stands there for about an hour and a half.

f) After that 1 process, the beer 2 (can) go into one of three or four 3 different areas....,

g) It has been a 1 different market but we see very much that Banks' mild 2 (can) hold its head high in the 3 bitter market as well.

h) 1 (can) I just ask, Ian, Banks' use a very traditional process Ian do you 2 think that's it's important in 3 brewing beers?

i).. the beer has 1 to settle and clarify for at least a day 2 before the licensee 3 (can) serve it in prime condition,

Figure 5.16 (cont.) Examples of consciousness-raising grammar tasks

E. Sorting

3. "Going" is also the continuous form of "go". Look at these sentences from the video and decide if they use "going to" (1) or "going" (2). Click on 1 or 2.

a) and that's been going on now for a very long time.

b) Where do you see the company going in the future?

c) Thank you very much David, yes, I'm going to go off now with Richard and have a look at the brewing process.

d) The process from then on is the difficult bit which is selling, ahh which we are going to ahh speak more about now.

e) That's right, OK and is it going well, Zamek?

f) This is Paul who's spent most of the day going round the brewery ...

F. Identification

Present Perfect tense.

The Present Perfect tense is formed with have/has + Past Participle. It is used when a speaker wishes to look back from the present to the past and to "retrospect".

1. Look at these sentences (a-f) from the video and click on those which have a Present Perfect tense in them.

a) ..on trade profitability has remained very high and continues to grow.

b) This is Paul who's spent most of the day at the brewery..

c) And they were an independent brewery like Banks'?

d) .. and we've imported the brand Zamek..

e) It has been a different market but we see very much that..

f) Have you found somewhere to park?

Figure 5.16 (cont) Examples of consciousness-raising grammar tasks

G. Judgement

2. Look at these sentences (a-f) and decide if they are grammatically correct or not.

Click on the tick or X

a) I have been to Paris last year.

b) She has this flat since 1992.

c) They has lived here since 1989.

d) Did you seen the film "ET"?

e) Shakespeare has written many plays.

f) I haven't ever eaten eels!

H. Matching

Passive.

The passive voice is formed with "be" + Past Participle. Read these sentences (a-) from the video and decide if they are present (PR), past (PST) or present perfect (PP) passives. Click on the appropriate letter.

a).. the wort and the hops is boiled up for an hour.. PR PST PP

b). which have been taken over in the past PR PST PP

c) the licensee is actually trained to be able to do that PR PST PP

d) make sure the beer is stored correctly ..PR . PST.. PP

e) .. we've always been based on this site ..PR PST PP

f) ... the products and services which are supplied by any company ...PR PST PP

Figure 5.16 (cont) Examples of consciousness-raising grammar tasks

The second approach to the development of grammatical understanding is through 'interpretation tasks' which involve "... focusing learners' attention on a

targeted structure in the input and enabling them to identify and comprehend the meanings it can realise" (Ellis 1997, p.149). It is thus comprehension-based rather than production-based and fits well with the use of video. Interpretation type tasks match forms to meanings, are designed to facilitate noticing and need learners to process the grammatical structure rather than to produce it. Another feature of these types of grammatical tasks is that learner response does not involve speaking or writing English, but involves a minimal non-verbal outcome such as ticking a box. Examples of the interpretation type grammar tasks are shown below in Figure 5.17 (A-C).

A. Form - function mapping

3. Can is used for different types of possibility. These are:-

   i) Ability - I can swim

   ii) Requests - Can you help me?

   iii) Offers - Can I help you?

   iv) Inability - She can't play the piano

   v) Deduction - They can't be from London.

   Look back at the sentences (a-i) above and decide what type of "possibility" the "can" is.

Figure 5.17 Examples of interpretation grammar tasks

B Rule provision

Conjunctions.

These are words or phrases which are used to link two clauses and tell us the relationship between the clauses. There are many conjunctions and they have some of the following different ways of linking clauses:-

a) to give extra information - meaning "and" - e.g. *and*

b) to contrast, meaning "but" - e.g. *but*

c) giving a cause or reason - e.g. *because*

d) giving a result - e.g. *so*

e) indicating the time e.g. *after*

f) giving the condition for something - e.g., *providing that*

Look at these conjunctions (1 - 20) and decide which type each is. Put a, b, c, d, e, or f, after each conjunction. The first one has been done for you.

1) however __(b) 2) since ___ 3) although _ 4) so long as __ 5) while ___

6) as __ 7) on the other hand ___ 8) that means ___ 9) so that ___

10) assuming ____ 11) unless ___ 12) moreover ___ 13) therefore ___

14) seeing that____ 15) what's even more __ 16) whereas __

17) then quite clearly ____ 18) despite ____ 19) so you can imagine ___

20) then quite clearly ____

Figure 5.17 (cont.) Examples of interpretation grammar tasks

C. Noticing

2. Watch the video and click on the number of "get + past participles" you hear.								
1	2	3	4	5	6	7	8	9

Figure 5.17 (cont.) Examples of interpretation grammar tasks

This approach to grammatical awareness used between 2 to 4 sequences of tasks of the kinds illustrated above, for each grammar area. In all cases the last task in the sequence was comprehension-based and asked learners to complete a grammatically focused task that needed to be done while they watched the video.

5.2.4.3.11 Vocabulary.

The decisions about what vocabulary to include in the application were made on the basis of predicted learner need of items that were relevant to the semantic field of business. This predicted learner need was matched against items that occurred in the edited video and these vocabulary items formed the basis of the topic areas. The aim was to use this section of the language work to extend and bring into the learning activities further vocabulary items not actually used in the video clips but which were related to those that were. Approaches to the development of L2 vocabulary i.e. McCarthy (1990), Gairns and Redman (1986) group vocabulary into semantic sets. The following twenty vocabulary areas were chosen using this principle.

1. Meetings 2. Numbers 3. Changes and Trends 4. Finance 5. Company Organisation, 6. Have 7. Advertising 8. Marketing 9. The market 10. Production 11. Costs 12. Products 13. Brands 14. Take 15. Staff 16. Make. 17. Sales 18. Adjectives (Order of) 19. A company. 20. Transportation.

The approach taken in the selection of the vocabulary for learning was as follows. First the transcript of each video clip was examined for groups of words from the same semantic field. Other vocabulary items which were from the same field and which also should be useful to learners were then added. Fig. 5.18. below shows some examples of this. The words, which were present in the video clip, are underlined.

Financial terms

funds rights issue shares profits borrowings a bank loan

overheads cash flow problem debts dividend investments

write off outgoings bankrupt earnings turnover a trading surplus

shareholders

Senior Posts

Managing Director Marketing Manager Chairman Head of Sales

Head of Personnel Vice-chairman Head of Advertising President

Changes and trends.

Declines rose declined eroded grow fall rise levelled off

plummet grow slump rocket shrink hold firm go up

shoot up improve jump come down stayed at remained steady

Market

attack the market dynamic sector of the market market-place

the bitter market research the market seller's market break into the

market market share market forces the British market open

up the market market leader market analysis market segment

a bull market

Meetings

Appointment board meeting presentation interview conference

annual general meeting date party get together

Figure 5.18 Some examples of the vocabulary selected for inclusion in the learning tasks.

The vocabulary learning tasks were of the types shown in Fig. 5.19 below

Matching

Numbers.

1. How do you say these different types of numbers? Say them aloud and then click on each number to compare your version with the computer.

a) 0902 – 322462	b) 1994	c) 29%	d) 29,000,000,000
e) £3.97	f) 0	g) 0.79	h) 7/8
i) 22nd	j) 30/6/94	k) 071-479-6754	l) 28,7864.98
m) 3.784	n) 17 3/7ths		

2. What type of numbers are a - n above? Write the letter next to the type below. The first one has been done for you.

Ordinals:-	Cardinals:-	Fractions:-	Decimals:-	Phone Numbers:-
Percentages:-	Dates:-	Years:-	Money:-	

Figure 5.19 The vocabulary task types

Ordering

Production

The following words are frequently used together with "production" e.g. production process. Look at the words below and decide if production goes before after the words. Put P in the space before or after the words, the first one has been done for you .

a) _P_ problems ____

b) ___costs ___

c) __ levels __

d) __ automatic __

e) __ capacity __

f) __ manual __

g) __ begin ___

h) __ halt __

i) ___ expand ___

j) __ line __

k) __ streamline __

l) __ rationalise __

m) __ cut back __

n) __ boost __

o) __ efficiency __

Grouping

Changes and Trends

Look at the verbs (a-r) below and decide if they describe an increase (I), a decrease (D) or no change, the same (S). Put I, D or S next to the verbs. The first one has been done for you.

a) fall D b) rise c) levelled off d) plummet e) grow f) slump

g) rocket h) shrink i) hold firm j) go up k) decline l) shoot up

m) improve n) jump o) come down p) have been eroded to q) stayed at

r) remained steady

Figure 5.19 (cont.) The vocabulary task types

Definition matching

Look at these definitions of the words above. Write the word after the definition.

a) The group of people who own a part of a company - shareholders

b) Income shareholders receive from their shares - dividend

c) Costs of running a company - overheads

d) The amount of money generated by a company - turnover

e) The offer to shareholders to buy further shares - rights issue

f) To leave debts owing to you uncollected - write off

g) Money which earns an income - investments.

Completion

Complete the following table with the correct forms of each of these nouns in column

1. The first is done for you.

Noun	Verb	Past	Past Participle
fall	fall	fell	fallen
rise			
shinkage			
growth			
decline			
slump			

Figure 5.19 (cont.) The vocabulary task types .

In all cases the last task in the sequence was comprehension-based and asked learners to complete a vocabulary task that needed to be done while they watch the video. Two examples are shown in Fig. 5.20 below.

Watch Fran Hayes, a brand manager, and write the numbers of the phrases from Exercise 3 that you hear. There are six and the first one has been done for you.

1 = a 2 = d 3 = f 4 = g 5= h

6 = i

Watch the Managing Director and write down the five financial terms from the list above that you hear. Write them in the order you hear them.

i) funds ii) rights issue iii) shares iv) profits v) borrowings

Figure 5.20 Examples of the final vocabulary task.

5.2.4.3.12 Language functions.

Language functions can be defined as the "purpose of an utterance". These began to be incorporated into language teaching syllabi about 20 years ago (Wilkins, 1976). They involve a focus on the uses of language rather than the forms of the language. The selection of the language functions included in this application was based on those which were thought by the author to be useful in the context

of business. The starting point for selection was the occurrence of a particular function in the video. The tasks then presented other linguistic forms which would realise these functions or closely related ones. The functions included in the application were:

1. Greetings, 2. Polite requests, 3. Addressing people, 4. Opinions, 5. Results, 6. Sequencing, 7. Connecting statements, 8. Emphasising, 9. Describing, 10. Comparing, 11. Generalising.

The range of learning tasks which were used to raise awareness of functions are shown below in Fig 5.21.

Formality of functions

Requests

The following sentences (a-h) are all requests. Which are formal requests and which are informal requests? Write I or F next to each sentence. The first one has been done for you.

a) Give me the sales figures, now! I

b) I wonder if you could possibly give me a ring later?

c) Can I have a lift home?

d) Could you fix up a meeting with them tomorrow?

e) Would you be so kind as to open the window?

f) Let's have another look at it.

g) Will you pick me up at 7?

h) I'd like us to meet again tomorrow.

Figure 5.21 Examples of the tasks used to raise awareness of language functions.

Explicit knowledge about functions

Addressing people

2. Look at these sentences about addressing people - are they true or false? Put a T or F after each sentence.

i) If you know somebody or have met them before you call them by their first name.

ii) If you are meeting somebody for the first time in a formal situation, such as business, you should use their title, Mr or Mrs and their surname e.g. Mrs Jones, or Mr Williams.

iii) When giving your name to a stranger you shouldn't use your title, but you do give your full name e.g. Jane Williams or Steve Brown.

Figure 5.21 (cont.) Examples of the tasks used to raise awareness of language functions.

Extending functions

Generalising.

1. Sometimes we need to make general or approximate statements about things. Possibly all the cases or facts you are referring to do not fit in with the generalisation so we need to make our statements more tentative e.g.:-

They tend to produce more in the summer.

By and large, we are out of the recession.

On the whole, profits are on the up.

In general, production is booming.

Can you think of any more words or phrases to make a statement less forceful? Click here to reveal some more.

(A click reveals)

All in all, For the most part, Overall All things considered,

In general, On average As a rule Generally,

Broadly speaking,... Mostly,.. On the whole

Figure 5.21 (cont) Examples of the tasks used to raise awareness of language functions.

Matching starts and ends of functions

Opinions

2. Look at these parts of sentences (a-e) and (i-v) which contain people giving their opinions from the video. Match the first half of the opinion with the correct continuation. Put the number after the first part of the sentence, the first has been done for you.

a).. its unique characteristics make it really stand out in the marketplace and again.. iv

b) ..the best raw materials, the best equipment, the best people, stick those all together and..

c) I believe there are..

d) ..if you have got that level of market share then quite clearly

e) ..is much more about product values than it is just about branding and ..

i).. three exciting initiatives that you are involved in at the moment.

ii)..its our belief that is actually the best way to produce the best quality product.

iii) ..the potential for growth is much greater.

iv) .. we believe consumers will be very excited by Cameron's Strongarm

v) .. I think that is the really interesting development in the beer business at the moment.

Figure 5.21 (continued) Examples of the tasks used to raise awareness of language functions.

Discourse functions

Sequencing

2. Look at these phrases and decide if they are used to talk about events which happened before (B), at the same time (S) or next (N) in the sequence. Put B, N or S next to each word or phrase. The first three have been done for you.

finally N	before this B	at the same time S	simultaneously
next	lastly	after this	prior to this
secondly	then	following this	preceding this
last but not least	subsequently	previously	earlier
in the mean time	meanwhile	in conclusion	during this/that time

Figure 5.21 (continued) Examples of the tasks used to raise awareness of language functions.

The last of the task sequences asked learners to watch the video and perform a task based on the understanding of, or recognition of, a designated function. An example is shown in Fig 5.22 below.

2. Watch David Thompson talking about the future of Banks' brewery and click on the 3 phases/words that you hear him use.

Actually,	indeed	Quite clearly	To put it mildly
To say the least	As/So you can imagine	Above all	Really
Without a shadow of a doubt,...		Undoubtedly	

Figure 5.22 An example of the last task in the sequence.

5.2.4.3.13 Pronunciation.

The application also aimed to raise learners' awareness of pronunciation and focused on sounds, syllables, word stress and intonation. It is accepted that second language learners' pronunciation is affected by the sounds of L1, learners' age, how much exposure they have had to L2, phonetic ability, motivation, and learners' attitudes towards, and concern for, preserving their identity (Kenworthy, 1987). Pronunciation work in the context of this application was to highlight receptive awareness rather than enhance productive skills. As the application was to be used by a variety of nationalities, each of which would have different pronunciation problems resulting from L1 interference, the selection of the pronunciation items followed consensus ideas on common, important features (e.g., Hewings, 1993). For example, the three possible pronunciations of the "-s" sound is grammatically important as a marker of the 3rd person singular and of plural nouns and the three different pronunciations of "-ed" important as a marker of regular past tense verbs. A similar approach to that used in the

selection of the grammar, vocabulary and functions items was adopted. The video clips were examined for particular pronunciation features, which were then added to with further examples to construct the target pronunciation features. The following pronunciation areas were included:

1. Sounds - "th", 2. Sounds - "c", 3. Sounds - "f" and "v",
4. Sounds - "p" and "b", 5. Sounds - "- ed" (1), 6. Sounds - "- ed" (2),
7. Sounds - "- s" (1), 8. Sounds - "- s" (2), 9. Sounds - "r" and "l",
10. Sounds - " / ə / schwa", 11. Sounds - "/æ/ /ʌ /, 12. Weak forms,
13. Stress (1), 14. Stress (2),
15. Intonation - Rising and falling tones.

The types of tasks used to develop receptive pronunciation awareness are shown below in Fig. 5.23.

Explicit understanding of sound - written relationships

Sounds - "c"

1. The letter "c" can be pronounced in 2 different ways. Sometimes it is pronounced /s/ as in "sun" and sometimes /k/ as in "can". Look at the phrases from the video below (a-j) and click on those where "c" is pronounced /k/.

a) it's nice to get b) fascinating c) you may have noticed
d) is particularly cost e) it's what the consumer
f) product that the customer g) Our trading area covers
h) a team of cellar advisers i) to settle and clarify j) the licensee

Figure 5.23 Examples of the tasks used to develop receptive awareness of the features of pronunciation.

Models of sounds

Weak forms of common words.

1. In English a lot of the small, grammar words have 2 different pronunciations. They have a strong pronunciation and a weak pronunciation. Most weak forms have the pronunciation / ə / . Click on the words below to hear the strong and the weak forms.

Strong	Weak.	Strong	Weak
does	does	of	of
has	has	at	at
do	do	can	can
a	a	but	but

Figure 5.23 (cont) Examples of the tasks used to develop receptive awareness of the features of pronunciation.

Recognition of stress and syllables

Word Stress (2)

1. Look at these words (a-k) pronounce them and decide how many syllables they have. Put a number after each word, the first one has been done for you.

a) hundred _2_	b) development	c) company
d) actually	e) surprisingly	f) although
g) acquisitions	h) incorporation	i) unusual
j) entirely	k) necessary.	

Pictures of mouth positions

Sounds /p/ and /b/

1. These sounds are often difficult for learners. Click on the 2 mouths below to hear the two sounds. The position of the tongue is the same but the /b/ sound needs voice.

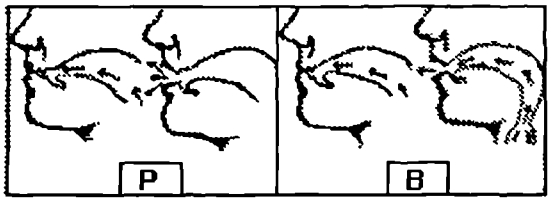


Figure 5.23 (cont) Examples of the tasks used to develop receptive awareness of the features of pronunciation.

Discrimination of sounds

2. Click on the numbers (a - l) below and you will hear a phrase from the video. Listen and decide if the word has a "r" sound or a "l" sound. Put R or L in the space - the first one has been done for you.

a) right	b) Richard	c) round	d) write	e) let	f) look
g) along	h) I'll	i) actually	j) He'll	k) like	l) range

Pronunciation rules

2. What do you think the rule for the pronunciation of /-s/ is ? Click here to reveal the rule for the three types of pronunciation.

The "s" is pronounced /-s/ if the "s" follows a /f/, /k/, /p/, /t/ or /th. sound.

The "s" is pronounced /-iz/ if the "s" follows a /s/, /z/, or a /dz/ sound.

The "s" is pronounced /-z/ in the majority of other instances.

Figure 5.23 (continued) Examples of the tasks used to develop receptive awareness of the features of pronunciation.

The final stage in the task sequences asked learners to perform a task which asks them to relate the area of pronunciation to the video. An example is shown below in Fig. 5.24.

> 3. Watch the video of Steve explaining what happens to the beer after it has left the company. Listen for these words (a-m) and decide if they have /i/ or /i:/ sounds. Put A or B after each word - the first one has been done for you.
>
> a) fleet (A) b) fifty c) which d) trading e) Midlands f) Bristol, g) really h) team i) advisers j) visit k) is l) indeed m) least .

Figure 5.24 An example of the last pronunciation task in the sequence.

5.2.5 Instructions to the tasks.

Each task had to be preceded by written on-screen instructions. Learner understanding of the instructions is essential in self-instruction. There is no opportunity for checking understanding as in the classroom situation. Non-comprehension of the instructions would negate all learning procedures and outcomes. To ensure clarity the sentences were as short as possible. They used simple grammar and vocabulary. Where possible an example task was already completed. The instructions were written according to the following standard three-part format, usually with a sentence for each. The first was a sentence of background information to supply the context e.g., in the Comprehension tasks

"Paul is talking to Fran a Marketing Manager at Banks' about his role in the company and about particular current marketing initiatives at Banks'" and in the Language Work section, *"The following sentences (a-h) are all requests."* This was followed by an explanation of the task objective e.g., *"Match the first half of the opinion with the correct continuation."* or *"Watch the video and choose the best answer a, b, or c."* The final part was the instruction on how to respond to the task e.g., *"Click on the best choice a, b or c."* or *"Put the number after the first part of the sentence, the first has been done for you."*

5.2.6 Feedback on the tasks.

The positive role of feedback to NNSs in the negotiation of meaning, see Pica (1994) and in assisting learners to 'notice the gap' in their comprehension (Schmidt, 1990) were described in Chapter 2. The positive role of feedback in the CALL context, see Bationo (1992) and research into the configuration of feedback, see Brandl (1995) and van der Linden (1993), were described in Chapter 4. Feedback was essential to the aims of the application. The type of feedback chosen for this application was right / wrong feedback (Brandl 1995) which would appear instantaneously on receipt of a learner response. This approach was chosen for three reasons. Firstly, the application aimed to develop listening comprehension, and the instant provision of text which further informed about any answer would detract from the purpose of the application. Listening would cease while any text was read. Secondly, the application included fully subtitled-video and these could be used to access the text of the comprehension

questions. Thus meanings which had been missed or misinterpreted when in their aural form subsequently could be accessed in their written form. Learners would then take responsibility for working out where and why their comprehension had broken down, thus encouraging learner autonomy. Lastly, in case learners were unable to answer the tasks the "Answers" button was included. A click on this automatically completed all the tasks with correct answers. This was included so that at all times learners would have access to the correct answers. The feedback appeared on-screen next to the learner response in the form of green ticks ✓and red crosses ✗.

5.3 The configuration of the application.

This section describes the configuration of the learning procedure in the multimedia application. It needed to ensure the effective delivery of the learning content described in the previous section. The interface was designed by other specialists in the production team and followed the general principles for human-computer interface design, for example Schneiderman (1992). Likewise, the visual design in terms of fonts, button design, colour scheme and layout was rendered by the graphics designer following standard guidelines, for example Galitz (1993). The author's role was to ensure that the features of the configuration were presented so as to facilitate language learning.

5.3.1. Screen layout.

The learning screen is shown in Figure 5.1, above. This is the only screen that learners need to know how to operate so reducing learner's time spent understanding how to use the application. Learners' experience of using multimedia applications in 1994, when the application was produced, was negligible and experience of hypertext was not widespread. Therefore, the use of one fixed interface would ensure that learners would not get lost in "hyperspace". All the features described below were constant no matter which learning activity they were engaged in. The screen was divided into two halves down the middle, the right side contained the input while the left-hand side delivered the tasks.

5.3.2 The components of the interface.

This section describes the function of each of the components of the interface.

5.3.2.1 Menu Bar.

The menu bar is at the top of the screen. The options for navigation and choice that are accessed through the menu bar are discussed in 5.3.3, below.

5.3.2.2. Orientation.

This section of the screen displays information about where learners are in the application. It is not interactive but takes a slightly different form depending on whether learners are engaged in listening comprehension or are using one of the four Language Work areas. Scene and Clip provide information about which video sequence and which video clip is available to be viewed. This is the same for both types of learning task. Levels are only applicable to Comprehension Work and either A. B or C appears next to Level. When learners are using any of the four Language Work options Level displays "Language Work - All levels" as there are no optional levels for this. Task will show either Before, While or After Watching, if Comprehension Work is being undertaken. It displays either Grammar, Vocabulary, Pronunciation, or Functions if Language Work is being accessed. An example from Language Work is shown in Figure 5.25 below.

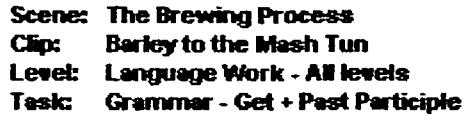


Figure 5.25 An example of the orientation component of the screen.

5.3.2.3 Video Window.

The video is played through the window on the right and is always displayed in this position. The example shows the video at 240 x 180 pixels although the application offers a smaller video picture at 160 x 120, for less powerful computers.

5.3.2.4 Subtitles for the video.

The subtitles appear directly under the video window. These are optional and can be turned off by the learner through Subtitles from the Menu bar. The subtitles are linked to the video image and appear automatically. Some multimedia applications that use subtitled-video ask learners to scroll through or advance the subtitles themselves with the mouse as the video progresses e.g., Longman Interactive Dictionary (1994). Scrolling while watching a video is likely to distract learners from comprehension of the input and so the subtitles were programmed to appear automatically. Care was taken over how long the subtitles appeared on screen to ensure that they appeared long enough to be read.

5.3.2.5 Hotspots.

The words that were selected from the video to be hotspotted appear underlined in the subtitles. The cursor changes from an arrow to a box shape when it is passed over a hotspotted word. In the example shown in Figure 5.26, "*initiatives*" was underlined in the subtitles and a mouse click on the word stops the video and the definition shown below appears. To continue watching the video this dialog box needs to be closed and the video restarted using the controls described next.

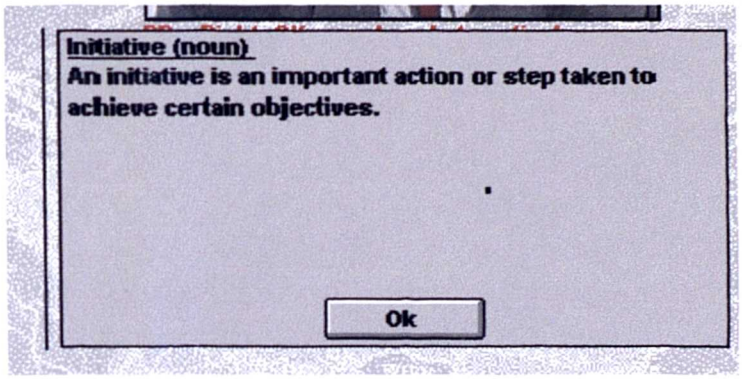


Figure 5.26 An example of the hotspots

5.3.2.5. Video Control Buttons.

The seven video control buttons appear at the bottom right of the screen. They operate with a mouse click and were designed to resemble the buttons found on a video recorder. Liou (1997) found that the use of video rewind was the most used type of comprehension aid.

This button enables the sound to be switched on or off. It was envisaged that teachers working on a one-to-one basis may use this facility with learners.

This button stops the video and removes the video picture. When restarted the video plays from the beginning.

This button moves the video forward. Each click moves the video forward to the next block of subtitles.

This button starts the video.

This button pauses the video and restarts the video.

This button rewinds the video. Each click moves the video back to the next block of subtitles.

This button rewinds the video back to the start of the scene.

5.3.2.6 Workplan.

A click on this button brings up a report on the areas of the application that the learner has used, as shown below in Figure 5.27.

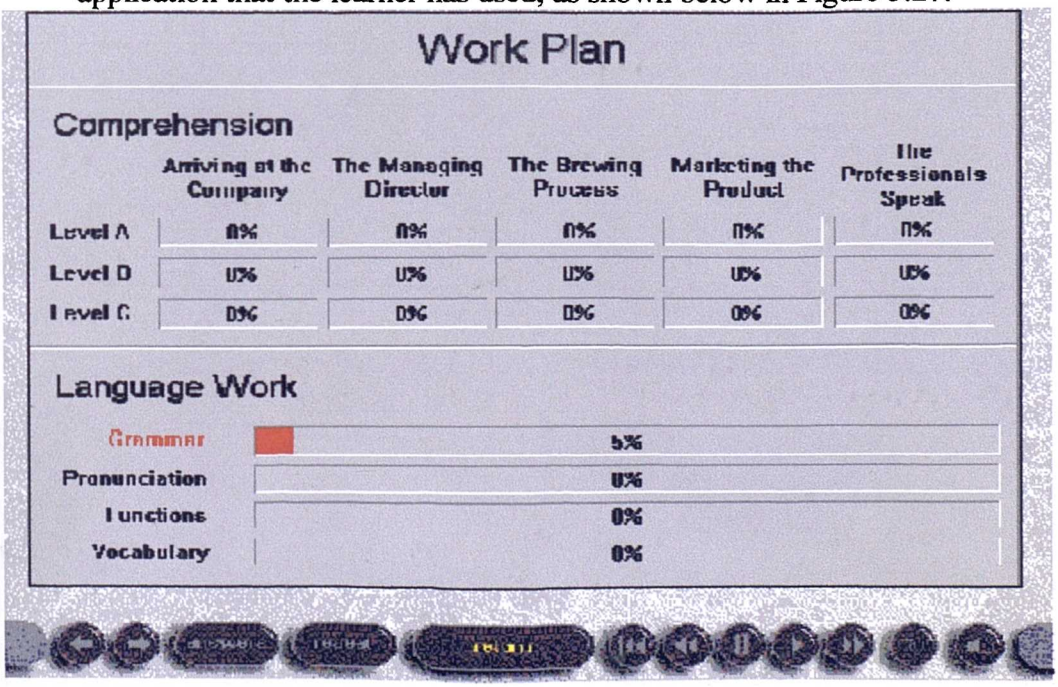


Figure 5.27 The workplan

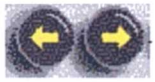
The Work Plan provides a simple way of displaying progress and is also an easy-to-use navigation tool. The top half of the workplan is for Comprehension and shows the five video scenes and the three levels. When a learner has visited one of these scenes the related box will indicate a figure for the percentage of the work undertaken and represent this as a red bar. The bottom half of the screen shows the same for Language Work and the example shown means that 5% of the possible work on Grammar has been attempted. A click on the Return button brings the learner back to the place that they left. Learners can also click on any of the 19 fields. Clicking on a field will display a dialog box asking which video clip learners would like to watch, in the same way as selecting a menu item from either the Comprehension Menu or the Language Work Menu.

5.3.2.7 The task control buttons

The four buttons of the left of the screen all control aspects of the learning tasks.

This button clears all the task responses that have been entered into areas of the learning page and allows the learner to repeat them. All feedback ✓ ✖ is removed from the screen.

This button automatically fills in the answers to all the tasks on the screen.


These two buttons move the learning pages. These buttons control the sequence of pages in the Comprehension work and move from the before-watching tasks to the while-watching tasks and then to the after-watching tasks. When clicked these buttons flash red.

5.3.2.7 The learning tasks.

The left hand side of the page displays the learning tasks. The following features and layout characterise all learning task screens.

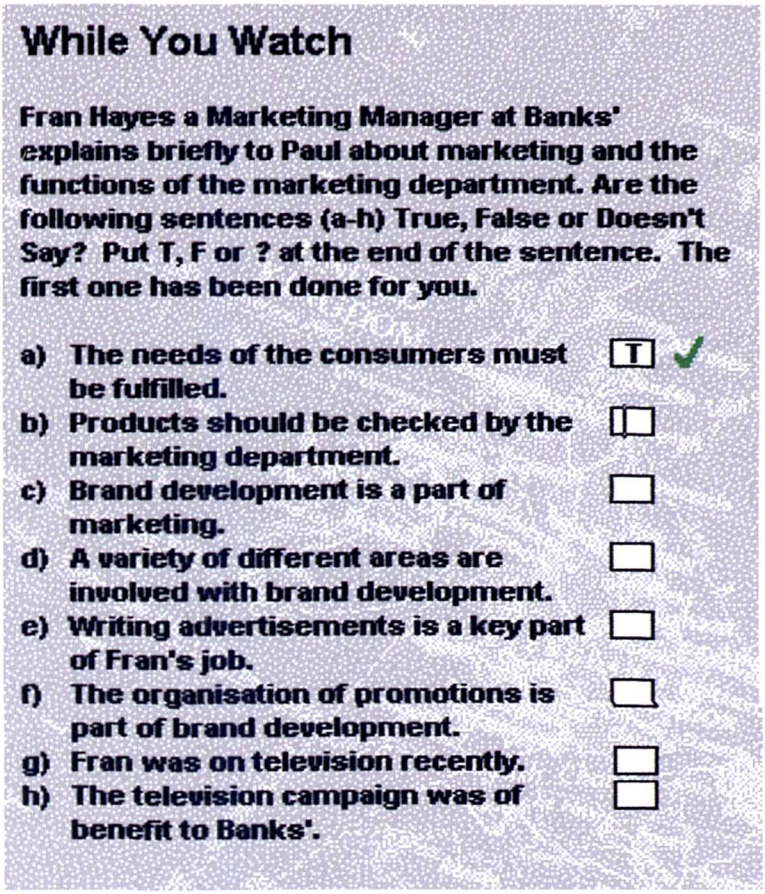


Figure 5.28 An on-screen example of a learning task

The title of the task is displayed at the top. In the example shown in Figure 5.28 it is a While You Watch task. Beneath this are the background and the instructions to the task. The background information in the example shown says "Fran Hayes a Marketing Manager at Banks' explains briefly to Paul about marketing and the functions of the marketing department". This always precedes the information about how to complete the learning task, in this case "Are the sentences (a-h) True, False or Doesn't say? Put T, F or ? at the end of the sentence." The learner enters the answers in the box and feedback in the form of a or a ✗ appears next to each response.

5.3.3 The Menu Bar and the options from the dialogue boxes.

Navigation through the application is via the menu bar. A menu bar with drop down menus was used as it was thought that most users would be familiar with this type of feature used in common word-processing packages. with which learners were already familiar. There are seven options on the Menu bar. The functions of each are described in turn.

5.3.3.1 File

The File menu affords the options shown in Figure 5.29 below.

Figure 5.29 The options from the File menu.

Selecting Load from the File Menu will restore the state of the application as previously saved. The application will automatically load the section of the application on which learners were working. Selecting Save from the File Menu saves the area currently being worked on. It does not save any of the answers, nor does it save the position of the video. The following will be saved: the tasks, the video clip, the video set up, the difficulty level (A, B or C) the task stage (Before, While or After), and the Work Plan information. The Print option allows learners to print the tasks that they are working on. Selecting this option displays a dialog box containing two options. The first option allows printing of the current exercise with answers, the second option allows learners to print the subtitles which go with the exercise. There is also a Printer Set-up option in the File Menu. This allows the setting of various printer options before printing an exercise e.g., in portrait or landscape orientation.

5.3.3.2 Comprehension menu

The dialog box from Comprehension is shown in Figure 5.30. There are two types of selection available. The first allows selection of the level of difficulty from three choices of A, B or C, as described in section 5.2.4.5 above. The second selection enables choice of the video sequence, as described in 5.2.1.1 above. Following a selection of video scene a page of tasks appears on the left of the screen and the first frame of the video sequence appears in the video box.

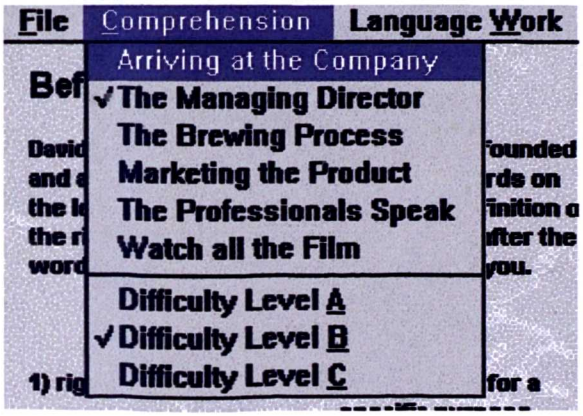


Figure 5.30 The Comprehension menu

5.3.3.3 The language work menu

The Language Work menu (Figure5.31 below) allows choice between grammar, pronunciation, vocabulary and functions. A click on one of the four provides a selection of up to 20 areas. The Language Work items are automatically linked to one of the video clips. Learners cannot select which video to watch.

5.3.3.3 The language work menu

The Language Work menu (Figure5.31 below) allows choice between grammar, pronunciation, vocabulary and functions. A click on one of the four provides a selection of up to 20 areas. The Language Work items are automatically linked to one of the video clips. Learners cannot select which video to watch.

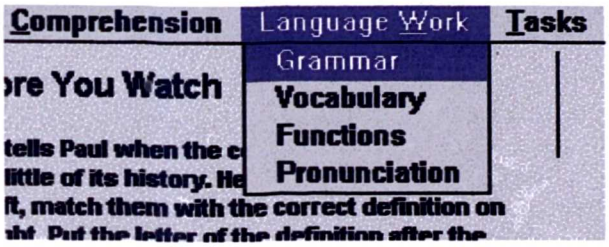


Figure 5.31 The Language Work menu

5.3.3.4 The tasks menu

This menu option allows learners to turn off the tasks on the left of the screen. There are two options, "tasks on" or "tasks off". This was included to allow teachers to write their own tasks.

5.3.3.5 Subtitles

This menu option allows learners to watch the video with or without the subtitles. The default option is with subtitles.

The Help menu contains written information about how to use the application and also how to learn with the application. Both sets of information are available in four different languages English (Default), French, German, Italian, and Spanish, all selected from Select Language. The How to use the Application help file includes the following help areas:

- About this CD,
- Using Comprehension,
- Using Language Work,
- Choosing a level, Choosing Video,
- Using Tasks, Using Work Plan,
- Using the Controls, Subtitles,
- Hotspots,
- Using Print Option,
- Using Save Option,
- Using Load Option,
- Selecting Your Language,
- About English For Business.

The Language Learning Help has sections on:

- The Good language learner,
- How to improve your listening,
- How to improve your grammar,
- How to increase your vocabulary.

This section contained language learning strategy advice as to how best to learn with the application, as recommended by Liou (1997). For reference there was a table of irregular verbs.

5.4 The second CD-ROM "*Managing Quality*"

A second CD-ROM was finished in June 1995. A copy is attached in Appendix F. This was entitled "*Managing Quality*" and was produced in the same way as "*Introduction to a British Company*". There were some differences between the two and these are briefly described here.

5.4.1 Content differences between '*Managing Quality*' and '*Introduction to a British Company*'.

This application had the same overall language learning aims as "*Introduction to a British Company*", but focused on the language of management. The video was filmed at Ricoh, a Japanese-owned electronics company producing photocopies, which is based in Telford, Shropshire. The application also differed from "*Introduction to a British Company* " in that there was no Pronunciation work included as an option from Language Work. The video was 32 minutes long and divided into six scenes. There were 164 sets of Comprehension tasks and 123 sets of Language Work tasks.

5.4.2 Interface differences between Managing Change and Introduction to a Company.

"*Managing Quality*" used a different specialist for the design of the human-computer interface and the graphics. It also used a different computer programmer. The interface for "*Managing Quality*" is shown below in Figure 5.32. If this is compared with the interface for "*Introduction to a Company*" in Figure 5.1 above there are immediate differences in the colour scheme, font sizes, button design and screen layout. Of importance to this study are the slight changes in the learning configuration. These are described briefly.

(i) Display of the questions: The major difference in the learning interface between the two applications is in the way the components of the tasks are displayed. In "*Introduction to a Company*" all the parts or questions making up a particular task, for example a 'Before you watch' task were displayed on-screen at the same time. This necessitated a small font and a lot of written text. The parts of each task in "*Managing Quality*" are displayed on-screen individually and in sequence. The next part of the task is displayed only after learners have responded to the previous one. The information about how many questions per task is displayed in a box above the feedback.

(ii) Subtitles and hotspots: The programmer used for "*Managing Quality*" was not as experienced as the one who had coded "*Introduction to a Company*" and he was not able to program hotspots to be accessed directly from the subtitles. This useful feature was omitted from "*Managing Quality*".

(iii) Glossary: The hotspots hyperlinked to definitions were replaced with a searchable glossary containing the definitions of words and phrases adjudged useful or problematic. This was accessed through the Help option on the Menu bar.

(iv) Position of the feedback to the tasks: The task feedback in "*Introduction to a British Company*" appeared next each question. In "*Managing Quality*" this now appears in a box, numbered according to the question.

(v) Video and subtitles buttons: The subtitles 'on' or 'off' button is now located under the video window, rather than being accessed from the menu bar as in "*Introduction to a British Company*". The controls for the video were relocated to be directly under the video window. The video buttons were not 'live' until a task which required the use of video was on the left of the screen. Observations of learners using the application showed that frequently the video was being watched while 'Before you Watch' tasks were displayed.

(vi) Addition of Next? button: The Next? button provides suggestions as to the learning activity which might be carried out next. These suggestions were included to assist learners in choosing their routes and navigating through the application.

(vii) Orientation Information: The positions of the information about the on-screen tasks were changed so that the video scene title was displayed above the video. The information about Task, Clip and Level now appeared at the bottom

of the screen. In addition, the box on the bottom left displays the function of the buttons when the mouse was passed over them.

(viii) Menu Bar: The following changes were made in the Menu bar. The workplan was now accessed through File on the Menu bar. The choice of levels was separated from the choice of video scene. A useful addition was the learning strategies advice as suggested by Liou (1997). This is accessed from the Help option and contained language learning advice related to the current on-screen activity, for example 'Before you Watch' or 'Vocabulary'. There were between 15 - 26 different pieces of advice per activity.

5.5 Summary

This chapter has described how aspects of the theoretical and practical consensus on language learning were translated into two multimedia applications. The next step in this research process is to investigate areas of effectiveness of the applications for different aspects of the language learning process. In order that these research questions, and the methods used to investigate them, are articulated within the contemporary CALL research paradigm, the next chapter reviews the research literature on the effectiveness of CALL and, in particular, of multimedia.

6. Computer Assisted Language Learning - Research Questions and Methods.

6.1 The CALL research agenda.

Much of the research into the effects of computers on language learning, undertaken in the late seventies and eighties, took the form of comparing computer-delivered instruction with classroom-based instruction. This line of research aimed to answer the question, "Is computer assisted language learning more (or less) effective than other forms of instruction?" For example, Schrupp, Busch, and Mueller (1983) compared the achievements of groups who exclusively used IVD with those who covered the same material on video and in a linear fashion. Likewise, Kleinmann (1987) compared reading achievements of ESL learners using either conventional reading materials or computer-based ones.

The nature of such research, comparing the achievement of an experimental group which has used computers, with a control group which has not, is now considered to be flawed. Clark (1983), an educational psychologist, noted that such research questions were unproductive, saying that research needs to move away

> ... from asking which medium was a better teacher to a concern with which 'attributes' of media might combine with learner traits under different task conditions and performance demands to produce different kinds of learning. (1983, p.473)

In the first meta-analyses of the studies into CALL, Pederson (1987) also questioned whether such a comparative approach to the effectiveness issue was the correct one. He also noted that CALL researchers were moving away from conducting such technocentric research. Researchers were recognising that the computer itself was not an agent which can directly affect learning. Therefore, without questions which were much more focused so that they encompassed many more of the factors which impact on language learning such as the nature of the learners, the interactions, and the contents and configuration of the software, researchers could not begin to evaluate the learning effects of CALL.

Dunkel (1987) provided an overview of the research literature that focused exclusively on the effectiveness of CALL in the "brief report and summaries" section of the 1987 *TESOL Journal.* She began by noting that " ... it was quite difficult to locate in print unequivocal empirical findings supporting the effectiveness of computer-assisted instruction (CAI) or computer-assisted language learning (CALL)" (1987, p.367) but that obviously with the cost of computer technology and with such technology becoming ever more prevalent in society, this was of great importance. She proposed that CALL research needed to focus upon:

> ... the interaction of student characteristics/attitudes toward computers and the effectiveness of CAI/CALL treatment ... the impact on L2 acquisition of CALL lessons focused on instructing LEP (limited English proficiency) students in English grammar and composition and reading and listening comprehension." (1987, p.371)

In an article primarily focused upon providing an overview of the nature and potential of all the technology on offer for language learning, Garrett (1991) also addressed the CALL effectiveness research issue. She, too, saw the studies comparing computer-based instruction with classroom instruction, which at that time comprised most of the CALL research base, as being:

> ... either inconclusive or flawed enough in their methodology so that claims continue to be asserted both ways. The real problem is that so general a research question can probably not be researched with validity without first identifying all of its individual, even microscopic, components. (1991, p.74)

In comparative research she saw that there were too many variables which cannot be controlled and concluded that "... the question "Does it work?" is simply not answerable on such a broad scale" (1991, p.75). She stated that:

> ... *the use of a computer does not constitute a method.* The computer is rather a medium or an environment in which a wide variety of methods, approaches or pedagogical philosophies may be implemented. (1991, p.75)

Instead she believes that:

> we need to break down the issue into a set of queries about interrelated and complex research variables: *what kind of software, integrated into what kind of syllabus, at what level of language learning, for what kind of language learners, is likely to be effective for what specific learning purposes?* (1991, p.75)

and that the CALL research agenda should "... begin with small research steps by using software which is designed to support significant learning and investigating its efficacy in local and carefully specified contexts" (1991, p.75).

More recently CALL researchers have been framing their research questions within a wide range of other disciplines. Salaberry (1996) in his article "A theoretical foundation for the development of pedagogical tasks in computer mediated communication" sets out to examine:

> ... the pedagogical merits of this new medium of communication in relation to current research in Anthropology, Cognitive Psychology, Communication Theory and Second Language Acquisition. (1996, p. 6)

Other authors have taken similarly diverse cross-disciplinary sources within which to frame their CALL research questions e.g., Garret (1995) used psycholinguistic theory, Bailin (1995) a computational theory of language use, and Oxford (1995) cited constructivism and individual differences theory.

Despite such eclectic perspectives, there are a group of researchers who have consistently argued that the objectives of any research into CALL need to be framed within the areas which are relevant to SLA. Chapelle (1990, 1995, 1997, 1998), Chapelle and Jamieson (1991), Chapelle, Jamieson and Park (1996) and Bernd Conrad (1996) have all written on how and why research into the effectiveness of CALL needs to be positioned within mainstream SLA research. The latter notes that there is now such a trend:

> Early CALL researchers attempted to assess the effects of CALL on learning outcomes, but have subsequently broadened their research objectives and methods to include those of other second language researchers who investigate classroom learning. (1996, p.33)

As the goal of CALL is SLA, investigation of the effects of computers needs to be focused upon the processes which SLA theory has identified as being facilitative. This means that in examining the effects of computers on L2 learning, researchers should be seeking to ascertain if the interaction with the computer replicates the processes which SLA sees as being beneficial to L2 development, and, if so, do the outcomes of such processes reflect L2 gains? Chapelle (1997) expressed this as follows:

> ... because the purpose of CALL activities is L2 learning, the most critical questions to be addressed about CALL are the following:
>
> - What kind of language does the learner engage in during a CALL activity?
> - How good is the language experience in CALL for L2 learning? (1997, p.22)

She states that SLA research methods are the most suitable starting place:

> With SLA research as a basis for investigation of CALL, the paradigm search of the next decade can be a quest for methods that complement our fundamental understanding of the language experience learners engage in through CALL activities. (1997, p.28)

Chapelle's two questions are primarily aimed at studies of computer work which involve learners in the production of written or spoken language, for example e-mail projects, or learner discussions stimulated by computer-based simulations. However, they do provide guidelines for the type of questions that research into

CALL applications, which have been configured in the light of comprehension-based SLA theory, might usefully address.

Bernd Conrad (1996) noted that, in general, research into the effectiveness of CALL had embraced the philosophy of communicative language teaching and that evidence of this is the research undertaken on computer-facilitated talk and interaction e.g., Borrás and Lafayette (1994), co-operative learning, e.g., Meunier (1994) and writing and on-line reference tools, e.g., Leefa (1992). In conclusion, he noted that the emergence of multimedia has created a state of flux in research and that the

> ... focal points of research and software development frequently have to be realigned due to ever-growing technological sophistication and the further refinements of language acquisition theories, both of which one cannot afford to ignore. As a result the research foundation for the design and implementation of CALL software is still unstable. (1996, p.171)

The focus of research into the effectiveness of CALL therefore needs to be the quest for computer-generated conditions and processes, which are also believed to contribute to SLA outside of the CALL environment. If the quality of the learning experience is assessed or examined in relation to the processes thought to be beneficial to SLA, then the type of research questions which may contribute towards an assessment of the quality of a comprehension-based CALL language learning experience might include the following:

- are learner attitudes positive towards an application?
- is increased comprehension facilitated by interaction with the software?
- does any negotiation of the meaning of input occur?
- does the use of CALL result in any incidental language learning?
- does the explicit "marking" of language items lead to "noticing"?
- are learner attitudes positive to the use of an application which complements their syllabus?

6.2 CALL research methods.

The field of enquiry into SLA has emerged in the last thirty years and in the last ten years there has been heightened concern to specify which research methods might be most suitable. A variety of books devoted entirely to research methods in SLA have been produced, for example Faerch and Kaspar (1987), Brown (1988), Seliger and Shohamy, (1990) and Nunan, (1992). Likewise in CALL research, as practitioners' awareness of the nature of the questions that research into CALL needs to answer has become progressively more focused, scholars have been concerned to outline the kinds of research methodologies which might be productive.

6.2.1 Validity and reliability in CALL research methods.

Chapelle and Jamieson (1991) in a chapter entitled "Internal and External Validity Issues in Research on CALL Effectiveness" attempt to specify which research methodologies might best be used. In particular they are concerned that any CALL research studies, like all other forms of research, are both internally and externally valid. These two concepts are defined as follows:

> Internal validity refers to the accurate attribution of observed experimental results to the factors that were supposed to be responsible for those results. External validity denotes the applicability of research results to instructional and research contexts other than the one in which the research was carried out. (1991, p.38)

They categorise CALL research methods into two types, quasi-experimental, that which seeks to find a connection between language achievement or proficiency and use of CALL, and descriptive research which seeks to describe student behaviours, strategies and attitudes to CALL. They further divide the quasi-experimental method into two types, "(1) CALL versus classroom instruction, and (2) one kind of CALL versus another type of CALL" (1991, p.40).

The literature review above explained why the first question is no longer pursued. However, research aimed at the second question might be conceptualised so that the independent variable is the CALL activity which learners undertake, and the dependant variable is the observed effect of the CALL treatment. They suggest that measures that can be used to assess the dependant variable, which is an increase in learners' language proficiency, range along a continuum. At one end

methods may include discrete item language tests, measuring knowledge of vocabulary or grammatical items, for example how to form the Present Perfect. At the other end of the continuum lie integrative language tests which measure overall communicative language proficiency, for example can learners now order a meal in a restaurant? Although measuring the dependent variable with discrete items serves to increase the internal validity of the research, it is also recognised that second language proficiency is more than the sum of knowledge of discrete items. Language testing specialists, for example Bachman (1990) espouse the use of integrative tests. The methodological problem which arises out of using integrative post-use tests is a reduction in internal validity, as it is not possible to identify precisely which aspects of language performance have been directly influenced by which of the components in the CALL application. In their summary of internal validity in CALL research they conclude that:

> ... in reality it is seldom possible to control all the relevant variables because of the stricture of time and the limited numbers of subjects available for testing. It is however feasible indeed - if not requisite - that researchers identify and explain the factors that may have influenced their research results. (1991, p.43)

As there is difficulty in accounting for all the factors that may influence the results in quasi-experimental research, Chapelle and Jamieson (1991) note that descriptive research methods, and in particular those which attempt to determine learners' attitudes towards CALL, have a major role to play in the investigation of the effectiveness issue. Surveys of learners' perceptions of their use of CALL fit in with the findings from researchers such as Gardner (1985) who have demonstrated the positive relationship between attitudes and achievement in

language learning. Chapelle and Jamieson (1991) recommend data collection instruments such as 5-point Likert scales and open-ended questions to measure learners' opinions and assessments of CALL's learning potential. To increase the internal validity of learner reports they recommend confidentiality, including multiple measures of the same attribute in attitude questionnaires, and use of observation data to crosscheck learners' statements. As with their assessment of quasi-experimental research, they conclude on a slightly pessimistic note:

> It is often impractical to administer the number and kinds of tests needed to uncover all the possible covariates influencing student attitudes and to obtain strong evidence for the validity and reliability of the self-reports or the survey instruments used. Is there anything of practical consequence, then, that can be learned from a CALL research study that may fall short of an optimal level of internal validity? (1991, p.48)

The answer to this lies in attaining external validity. External validity being the extent to which results from one study can be generalised to also hold true in different contexts. To achieve this researchers need to be transparent in their descriptions of: (1) the CALL materials being used, (2) the nature of the subjects, and (3) the target language context. Each of these will have a definite effect on any data and thus influence how applicable the results may be to other CALL contexts. Chapelle and Jamieson recommend that authors and consumers of research reports must consider external validity by asking, "Within what context, with what kinds of students, and using what kinds of materials, were the results obtained?" (1991,p.53). Inevitably, they conclude that, as with all educational research,

> Whereas it is easy to articulate the criteria that help ensure the internal validity of the research, it is not easy to apply these criteria consistently when conducting CALL investigations. In fact, researchers are rarely able to implement all of these criteria with 100% success; if only "flawless" research were to be considered, speculations and contentions about CALL use would remain forever unsupported or refuted by empirical data. (1991, p.54)

6.2.2 Classroom SLA research methods and CALL research methods.

In an update to their earlier chapter, Chapelle, Jamieson and Park (1996) provide a chapter on research methods in *Power of CALL* (Pennington ed., 1996). This advocates fusing CALL research methods with those used by second language classroom researchers. They follow the paradigm of four perspectives on classroom research, as proposed by Chaudron (1988), and review and describe some of the CALL research that has been undertaken using each of these four perspectives. Although only one of the studies recounted in this chapter concerns multimedia, their ideas on research methodology are of direct relevance to the research described in the following chapters.

The four classroom research traditions described are:

- psychometric
- interaction analysis
- discourse analysis
- ethnographic research.

Psychometric research aims to assess whether computer use affects learning outcomes. They see three types of psychometric research: into cognitive outcomes, into affective outcomes, and into individual variation. Cognitive-based research investigates whether there are significant learning outcomes, usually employing a pre-test and post-test methodology, or they compare computer based learning outcomes with those achieved in similar non-computer based contexts. Most of these type of CALL studies have yielded mostly positive results. Affective research looks at learners' attitudes to CALL. Individual variation research examines the differential effects of the different aspects of CALL environments or it examines the effects on different types of learners, for example those of differing abilities or with preferences for different learning styles e.g., field-independent and field-dependent. Research into individual variation may also examine effects of different types of courseware characteristics, for example a variety of feedback types. Chapelle, Jamieson and Park sum up their review of the psychometric approach by saying:

> Because of the particular settings, materials and students involved, any one study lacks generalizability. (...) research within the psychometric tradition should be beginning to generate results that can be aggregated, yielding patterns that can inform both instructional design and second language theory. (1996, p.38)

In interaction analysis the classroom researcher's task is to observe and document instructional events and then to relate these to language learning. Such methods have been applied to CALL where student computer interactions are logged by the computer and then analysed. In pedagogically focused interaction analysis, learners' strategies while using software have been observed, and learners'

interactions have been related to subsequent performance. Thus by observing, controlling, or recording interactions and relating these to any differential performance on subsequent measurable activities or tests, it may be possible to delineate which types of interactions or computer-delivered options differentially affect language learning.

Psycholinguistic-based interaction analysis investigates the development of the processes used for language performance and of increases in learners' linguistic knowledge, attributable to the use of CALL. This line of enquiry attempts to record the strategies that learners adopt within a CALL environment and to match the use of such strategies to those thought beneficial for language development. It might use methods such as observation, computer-recorded data, or self-reports on learners' strategies.

The discourse analysis approach examines texts, both oral and written, that learners produce in the CALL environment. It also examines learners' interactions with texts delivered by computer. The examination of student to student discourse as a product of their use of the computer as a stimulus, e.g., Piper (1987), is an example of such research. Other discourse analysis methods might be observation, self-reports or the matching of learner output with the linguistic items in CALL input.

The last type of classroom research related to CALL is ethnographic research, which tries to understand both the micro and the macro contexts of CALL. This generally uses a combination of research methods such as interviews, diary

studies, and observations, all of which are collected over a period of time. Chapelle, Jamieson and Park see the advantage of ethnographic methods as being an increase in external validity and thus the ability to generalise from any one piece of CALL research:

> With its holistic approach, ethnographic studies of CALL can provide evidence about students' interaction and learning in view of the complete context. This holistic view is necessary to provide a thorough and meaningful understanding of how learning takes place. (1996, p.50)

Chapelle (1997) also proposed that the most useful and productive research methods may be those based upon discourse and interaction analysis which have also been extensively used to examine second language classroom learning activities. The most critical questions to be answered by CALL researchers she states are: "What kind of language does the learner engage in during a CALL activity? How good is the language experience in CALL for learning? (1997, p.22).

The first question concerns the description of all the language in any CALL learning activity, and research will need to describe the input to the learner, the output, and the interaction generated. The second question proposes evaluation of the quality of the language, as input, as output and in interaction. This can then be related to the types of language considered by the interactionist perspective (e.g., Doughty, 1991a; Pica 1994) to be most beneficial for L2 development. Such language: i) is meaning-focused, ii) allows opportunities to

attend to linguistic form and, iii) provides opportunities for modified output.

Chapelle believes interactional modifications may also be:

> ... applied to activities with audio and video input in which modifications consist of simplified aural input (e.g., segmented input), textual transcription of the aural language, or elaboration on meaning and usage of the language of the input. These interactional modifications initiated by the learner on input from the computer should yield similar psycholinguistic effects as those in oral face-to-face linguistic exchanges. (1997, p.14)

She advocated, therefore, that CALL research should adopt the methods used by classroom SLA researchers:

> With SLA as the basis for investigation of CALL, the paradigm search of the next decade can be a quest for methods that complement our fundamental understanding of the language experience learners engage in through CALL activities. (1997, p.28)

The nature and the aims of the software will guide the ultimate choice of research methods used to investigate a multimedia application. In order to try to evaluate whether this application has a beneficial impact on language learning, five different studies were carried out. Each study focused on a different aspect of the SLA process and thus investigated the effects of some of the different features of the software. Likewise, each study was designed to evaluate the application in the light of the theory which had shaped its configuration. They employed a variety of the research methods described above.

6.3 The research questions.

Little of the literature on the appropriate research questions for CALL has been specifically focused upon multimedia. CALL covers a broad spectrum of language learning activities, from the use of drill and practice software, the use of computers as a stimulus for spoken interaction in simulations, and the use of e-mail for developing written and reading skills. Each computer application has its own intended learning outcomes, different input and different procedures for achieving the outcomes. Consequently, the research questions for each application need to be related directly to such features. Garrett's (1991) articulation of the research agenda for CALL as:

> ... a set of queries about interrelated and complex research variables: *what software, integrated into what kind of syllabus, at what level of language learning, for what kind of learners, is likely to be effective for what specific learning purposes?* (1991, p.75)

provides a starting point for defining the questions that this research addresses.

The first decision was to pose a "set of queries". Through asking a series of different questions which each focus on a different aspect of the language learning process it may be possible to build up a holistic picture of how, why and in which areas this multimedia application might be effective. These are outlined in the following section. The questions fit into Garrett's framework as follows:

- *What software?*

  The English for Business applications described in Chapter 5.

- *Integrated into what syllabus?*

  A final year undergraduate syllabus for business English.

- *What kinds of learners?*

  European, computer-literate, and at a level equivalent to Cambridge First Certificate or above.

- *Is likely to be effective for what specific learning outcomes?*

  The learning outcomes of the research are matched with the themes from SLA which originally framed the design of the application and were described in Chapters 2, 3, and 4. Restated briefly these were:

    - to increase motivation
    - to foster comprehension and therefore possible SLA
    - to be used as an environment to enable negotiation of meaning with input and therefore possible SLA
    - to investigate incidental language learning and the ability of multimedia to facilitate noticing through provision of saliency
    - to be used as autonomous self-study material

These broad areas were broken down into five more specific questions, each with a related cluster of sub-questions. The following sections articulate each of the five questions and their components.

6.3.1 Question 1 - What are learners' attitudes to the application?

The first question examined learners' attitudes to the application and their perceptions of its usefulness for aspects of the language learning process. This question was the first to be investigated as it was the most fundamental. If learner reactions to the application were negative then this would undermine further research into its effects. An overview of the first research question is shown in Table 6.1 below.

TABLE 6.1 RESEARCH QUESTON 1. LEARNERS' ATTITUDES TO THE MULTIMEDIA APPLICATION. AN OVERVIEW OF THE RESEARCH QUESTION ADDRESSED IN CHAPTER 7.

SLA Theory fit	**Research such as Gardner (1985) has demonstrated the positive relationship between motivation, attitudes and achievement in language learning.**
Main research question	What are learner attitudes towards this multimedia technology for aspects of language learning?
Subsidiary questions	What are i. learner attitudes towards multimedia technology? ii. learners' perceptions of the learning effectiveness of the application? iii. learners' perceptions of the self-study potential of the application? iv. the differences in attitudes between learners of different abilities?
Methods	Attitude questionnaire Open-ended questions Self-assessment profile Chi square tests Observation Recording of post-use behaviour

The study focused upon learners' attitudes in three areas:

- whether the use of multimedia was viewed by learners as being an enjoyable experience,
- if learners would view multimedia as being a potentially useful skill development and language learning tool,
- did learners think that multimedia would be a potentially advantageous tool for self-study?

The fourth area of interest was to try to establish if there were any differences in attitudes between types of learners and their assessment of the potential of multimedia to assist them.

6.3.2 Question 2 - Can the applications be integrated into the curriculum?

The second research question was designed to assess if the application could be integrated into a syllabus and used as a free-standing supplement to classroom-based instruction. It investigated attitudes to the application when learners were extrinsically motivated to use it. An overview is given in Table 6.2 below.

TABLE 6.2 RESEARCH QUESTON 2. THE INTEGRATION OF, AND LEARNERS' ATTITUDES TO, THE USE OF THE APPLICATIONS AS A FORMAL PART OF THE CURRICULUM. AN OVERVIEW OF THE RESEARCH QUESTION ADDRESSED IN CHAPTER 8.

SLA theory fit	**i) The integration into the curriculum of the applications** **ii) Extrinsic motivation and learners' attitudes to the application.**
Main question	Could the free-standing use of the application be integrated into the curriculum and be used as a mandatory and assessed component of the syllabus?
Subsidiary questions	What are i) learners' attitudes to this multimedia application when its use was mandatory and assessed? ii) learner strategies in the use of this multimedia application for an assessment? iii) the difference in learners' performance on a multimedia-based assessment when compared to their performance on other assessments?
Methods	Pre and post-use attitude questionnaires Self-reports on strategy use Statistical comparison of test performances Observation of use of the applications Follow-up questionnaire

This second question fits into the ideas about the benefits to learners, which are provided by facilitating autonomous language learning, for example Dickinson (1987), Benson and Voller (1996). This study aimed to assess learners' attitudes to the application when it was:

- used both as a required self-study component of an undergraduate module
- used over an extended period.

The study also tried to discover whether the application, used in a self-study mode, might also be used as the basis of a formal assessment. A key element in the evaluation of the application's use in formal assessment would be the quest to determine any significant differential effect on learner performance in this assessment, as compared to their performance on their other assessments throughout the semester.

6.3.3 Question 3 - Does real-time feedback to comprehension tasks increase levels of comprehension?

The third research question focuses on the ability of the multimedia environment to make input comprehensible and is framed by the work of SLA theorists such as Krashen, (1982, 1985). An overview is shown below in Table 6.3. This area of SLA theory holds that it is input which is comprehensible which is most likely to result in intake. In addition, greater original comprehension of any input material is likely to be reflected in better recall of the original language of such input. In classroom-based work on the development of listening comprehension it is common pedagogical practice to provide meaning-focused tasks to assist and support comprehension e.g., Field (1997). One feature of this multimedia environment, which may lead to greater comprehension, is the availability of instant and on-going feedback to real-time comprehension tasks. Learners' self-articulated opinions on if, and how, any of the features of the multimedia environment facilitated greater comprehension should also help understanding as to whether, and how, this multimedia environment contributes to increased comprehension.

TABLE 6.3 RESEARCH QUESTON 3. THE EFFECT OF REAL-TIME FEEDBACK TO COMPREHENSION TASKS ON COMPREHENSION SUCCESS IN THE MULTIMEDIA APPLICATION. AN OVERVIEW OF THE RESEARCH QUESTION ADDRESSED IN CHAPTER 9.

SLA Theory fit	**Comprehensible input is necessary to facilitate SLA e.g.; Krashen (1982)**
Main question	Does the availability of instant feedback to comprehension tasks increase comprehension?
Subsidiary questions	Are there any i. Differences in comprehension task success rate when real-time feedback is available? ii. Differences in language recall success rates when real-time feedback is available? iii. Self-reported advantages to listening comprehension undertaken in this multimedia environment?
Methods	Real-time multiple choice comprehension questions Post-use cloze tests Post-use questionnaire

6.3.4 Question 4 - What are the effects on comprehension and language reuse of the different combinations of learning resources?

The fourth research question aimed to provide initial insights as to how access to a variety of different learning resources, and the ability to negotiate with these resources, may differentially affect comprehension and the reuse of the language in the original input. An overview is shown in Table 6.4 below.

TABLE 6.4 RESEARCH QUESTION 4. THE EFFECT OF THE MULTIPLE MEDIA UPON FACILITATING COMPREHENSION. AN OVERVIEW OF THE RESEARCH QUESTION ADDRESSED IN CHAPTER 10.

SLA Theory fit	**It is the process performed upon input to make it comprehensible 'negotiation of meaning' which facilitates SLA e.g., Pica (1994)**
Main question	Does the provision of the multiple media of video, subtitles and meaning-focused tasks with feedback with which to negotiate comprehension facilitate greater comprehension and language reuse?
Subsidiary questions	Are there any i. differences in comprehension through access to different combinations of media? Ii differences in language reuse through access to Different combinations of media?
Methods	Recall protocol - written scripts analysed as to: a) recall of language from the input b) recall of ideas from the input

This is framed by ideas about the role of negotiation of meaning in SLA e.g., Pica (1994). This multimedia program had three major learning resources: video, comprehension tasks with feedback, and subtitles to the video. This research question investigated whether learners were able to increase their comprehension,

and recall of language, when provided with different combinations of learning resources, the multi in the multimedia. If learners are able to negotiate a greater understanding and a higher short-term recall of linguistic items by using and controlling a variety of learning resources, it is useful to discover which combinations of resources have most impact.

6.3.5 Research Question 5 - Is there any effect on language reuse of those linguistic items which were made salient in the multimedia environment?

The fifth research question investigated the effect of multimedia to facilitate the learning of selected language items through giving them particular salience in such an environment. This can be achieved through hypertext definitions, tasks to highlight specific language items, or through a video illustration. The ability of multimedia to make linguistic items *salient and bring learners to notice them* through conscious attention, for example Schmidt (1990), Chapelle (1998), is believed to be one of its benefits. This study examined the incidental learning effects of the linguistic items made salient, when the applications were used over a period of time. In particular it attempts to quantify which, if any, of the linguistic items, for example vocabulary or phrases, which were available in the multimedia input environment, were spontaneously reused by learners. Spontaneous reuse might then indicate the incidental learning of such items. In addition, the research tries to quantify if those linguistic items that have been made salient were reused more frequently than those items which were encountered only as unmarked input. An overview is provided in Table 6.5 below.

TABLE 6.5. THE EFFECT OF SALIENCE IN THE MULTIMEDIA APPLICATIONS UPON LANGUAGE LEARNING. AN OVERVIEW OF THE RESEARCH QUESTION ADDRESSED IN CHAPTER 11.

SLA theory fit	**Conscious attention to the L2 forms helps learners' development of linguistic forms e.g., Schmidt (1990) and Ellis (1997)**
Main question	Are those linguistic items made salient and available for conscious attention in the multimedia environment reused by learners?
Subsidiary questions	Is / are there any i. reuse of linguistic items experienced in learner-determined and extended use of the applications? ii. differences in the reuse of those linguistic items made salient in the multimedia environment, as opposed to those not made salient? iii. differences in the reuse of those linguistic items made salient through either: a) being the focus of tasks? b) being configured as a hypertext link to a further definition? c) being portrayed through a moving video image?
Methods	Written exam scripts which were analysed for reuse of the language which was contained in the application

7. Learner Attitudes to the Multimedia Application.

7.1 Aims.

The study aimed to measure learners'

- affective reactions to the application,
- opinions on how useful the application might be to the language learning process,
- opinions on how useful the application was for self-study.
- differences in the attitudes between learners who saw themselves as more, or less, proficient in English.

7.1.1 Hypotheses.

1. The majority of the subjects would:
    a) have positive attitudes to this multimedia application,
    b) perceive the application as being effective for their listening comprehension and / or language development,
    c) perceive the application as being effective for self-study.

2. Subjects who

   a) saw themselves as less able would have significantly more favourable attitudes to the multimedia application,

   b) studied independently and practised their listening alone infrequently would have significantly more favourable attitudes to the multimedia application.

7.2 Methods.

7.2.1 Subjects.

The subjects were 107 NNS undergraduates who were taking business English modules at the University of Wolverhampton. The group could be considered as homogenous as any group of language learners. They had been tested and placed using the *Oxford Placement Test* (Allen, 1992) and were at an Advanced level, roughly equating to the level of the *Cambridge Advanced English* exam. Subjects were different nationalities, but predominantly from France, Germany and Spain. All were computer literate in that they had used a computer for word-processing. They were taught in twelve separate classes, with a maximum of eighteen in each class.

7.2.2 Data collection.

7.2.2.1 Self-report questionnaires.

Self-report questionnaires (SRQ) have been widely used to investigate a variety of attitudinal dispositions in language learning e.g. Gardner and Lambert (1972), Chapelle and Jamieson (1991). They have generally taken the form of a series of statements to which subjects respond on a 5 point Likert scale from "Strongly agree" to "Strongly disagree". There has been some disagreement as to the validity and reliability of such measures of attitudes. Oller (1977, 1981) believes they encourage subjects to give the responses they believe researchers want to hear. Gardner (1985), on the other hand, believes that with careful thought and the inclusion of multiple measures of similar attitudes that this can be guarded against. The latter approach was adopted here, and the SRQ included two measures for each attitudinal trait, for example, '*motivating*' and '*not motivating*', and '*fun*' and '*boring*'. It also included an open-ended question asking for subjects' responses as to their likes and dislikes of using the application. The questionnaire is shown in Appendix G. An initial version of the questionnaire was piloted with 16 Czech EFL lecturers, following their use of the application, and this led to the deletion and alteration of statements.

The questionnaire has five distinct sections. The first section comprises Questions 1, 2, and 3 that provide learners' self-assessment of themselves as: listeners, independent learners, and independent developers of their listening

comprehension. The data from these three questions was used in conjunction with the responses to Question 4 to test hypothesis 2. In Question 4 there are eight statements to measure general attitudes, six to measure attitudes on the application's learning potential, and twelve statements on its potential for self-study. The connection between the questions and the hypotheses are shown below in Figure 7.1. The statements appeared in random order. In order to verify the consistency and validity of learners' self-reports each attitudinal trait was measured through both a positive and a negative statement.

Hypothesis	Questionnaire Number	Attitudinal statements
1. The majority of the subjects would a) have positive attitudes to this multimedia application	4	fun, is not enjoyable, is simple, is complicated, is interesting, is boring, is motivating, is not motivating
1. The majority of the subjects would b) perceive the application as being effective for their listening comprehension and / or language development	4	will improve my listening comprehension, doesn't help me practice my listening, will help me learn new language e.g. vocabulary, won't improve my vocabulary, would improve my English, won't make my English better.
1. The majority of the subjects would c) perceive the application as being effective for self-study	4	allows me to work at my own speed, doesn't allow me to work at my own speed, is relevant to my needs, is not relevant to me, gives me useful feedback, doesn't give me feedback, gives me flexibility, is not flexible, would encourage me to study alone more, would not encourage me to work alone more, gives me complete control over my learning, gives me no control over my learning.
2. a)Subjects who saw themselves as less able would have significantly more favourable attitudes to the multimedia application	1	Associated with all the attitudinal statements in Question 4 above.
2. b) Subjects who studied independently and practised their listening alone infrequently would have significantly more favourable attitudes to multimedia.	2 and 3	Associated with all the attitudinal statements in Question 4 above.

Figure 7.1 The relationship between the hypotheses and the statements included in the questionnaire in Appendix H

Question 5 was open-ended. It provided further data on aspects of hypothesis 1 or 2 in that subjects could justify, or be specific about, their opinions as well as comment on any aspect of the application which might have been overlooked in Question 4.

Question 6 was included to elicit learners' ideas on whether the program had a closer resemblance to a book, a reference book, a tool, a game or a teacher. They ranked these in order from greatest to least similarity.

7.2.2.2 Observation.

In addition to the information gained from the questionnaire, the researcher and other lecturers supervising the sessions observed learners' use of the application, their reactions to the computer-based session, and their participation in the learning activities. Comments were noted down and reported verbally to the researcher.

7.2.2.3 Amount of independent use of the application.

The application was made available for subjects' use after this introduction. They were able to borrow the CD-ROM from the School's self-access centre. The number of uses was recorded.

7.3. Procedure.

Each of the twelve groups used the application during one hour of supervised class time. This was done in a multimedia-computer laboratory equipped with 30 MPCIIs and headphones. In the first ten minutes of the session subjects were

introduced to the *Introduction to a Company* application, shown its major features, including how to operate and control it. Subjects then used it as they chose for about forty-five minutes. Help was on-hand to deal with any technical problems. They were then asked to anonymously complete the questionnaire.

7.4. Results.

7.4.1 Attitudes to the multimedia application.

The data from Question 4 shows general attitudes, opinions as to possible learning efficacy, and opinions on the application's potential as a self-study tool. These results are presented as a percentage in Tables 7.1, 7.2 and 7.3 below.

7.4.1.1 General attitudes to the application.

Table 7.1 indicates that subjects' general attitudes to using this multimedia application were overwhelmingly favourable. Responses to all the statements showed more than 80% reacted positively. The most positive reactions were to its *'usefulness'*, *'ease'* and *'fun'*.

TABLE 7.1 SUBJECTS' GENERAL ATTITUDES TO THIS MULTIMEDIA APPLICATION IN PERCENT.

Attitudinal Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No reply
is easy	30.8	42.1	22.4	2.8	0	1.9
is fun	32.7	39.3	23.4	3.7	0	0.9
is motivating	24.3	49.5	19.6	2.8	0	3.7
is simple	33.6	53.3	6.5	3.7	0	1.9
is interesting	31.8	48.6	11.2	3.7	2.8	1.9
is useful	47.7	43.9	5.6	0	0	2.8
is a waste of time	1.9	0.9	6.5	45.8	43	1.9
is difficult	0	2.8	14	47.7	33.6	1.9
is not enjoyable	0	0.9	14	50.5	32.7	1.9
is complicated	1.9	2.8	11.2	51.4	29	3.7
is boring	0.9	2.8	12.1	48.6	32.7	2.8
is not motivating	0.9	2.8	12.1	48.6	32.7	2.8

7.4.1.2 Attitudes to the language learning potential of the application.

Table 7.2 reports subjects' opinions as to how effective they thought this application might be for three areas of the language learning process, listening comprehension, vocabulary learning and general improvement. The percentages show that for improving listening comprehension more than 85% agreed, or strongly agreed, that it would be effective. For learning vocabulary the figures are

equally positive. Likewise for general learning more than 84% of subjects agreed, or strongly agreed, that the application would have a beneficial effect.

TABLE 7.2 SUBJECTS' ATTITUDES TO THE LEARNING POTENTIAL OF THIS MULTIMEDIA APPLICATION IN PERCENT.

Attitudinal Statements	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**No reply**
will improve my listening comprehension	30.8	56.1	10.3	1.9	0	0.9
will help me learn new language e.g. vocabulary	30.8	56.1	7.5	1.9	1.9	1.9
would improve my English	27.1	57	11.2	2.8	0	2.8
doesn't help me practice my listening	0	1.9	4.7	52.3	39.3	1.9
won't improve my vocabulary	0.9	0.9	5.6	53.3	36.4	2.8
won't make my English better	0	5.6	7.5	55.1	29.9	1.9

7.4.1.3 Attitudes to the self-study characteristics of the application.

Table 7.3 shows that subjects believed quite strongly that this multimedia application had the characteristics of an effective self-study resource. For example, more than 79% believed it '*gives useful feedback*' and more than 90% responded that it '*allows me to work at my own speed*'. The characteristics most

strongly valued were its ability to allow subjects to control the pace of their learning, its flexibility, and its relevance to needs. Subjects were less positive about whether the application would *'encourage them to study alone more'*, or whether it *'gave them complete control'* over their own learning. Nevertheless, the majority of responses were positive.

TABLE 7.3 SUBJECTS' ATTITUDES TO THE SELF-STUDY CHARACTERISTICS OF THIS MULTIMEDIA APPLICATION IN PERCENT.

Attitudinal Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No reply
allows me to work at my own speed	52.3	38.3	5.6	1.9	0	1.9
doesn't allow me to work at my own speed	0	0.9	8.4	46.7	41.1	2.8
is relevant to my needs	33.6	40.2	24.3	0.9	0	1.9
is not relevant to me	0	7.5	9.3	53.3	28	1.9
gives me useful feedback	28	51.4	17.8	0	0	2.8
doesn't give me feedback	1.9	1.9	15.9	51.4	27.1	1.9
gives me flexibility	28	43.9	24.3	1.9	0	1.9
is not flexible	1.9	3.7	12.1	56.1	22.4	3.7
would encourage me to study alone more	37.4	30.8	22.4	6.5	0.9	1.9
would not encourage me to work alone more	0	11.2	17.8	37.4	31.8	1.9
gives me complete control over my learning	13.1	42.1	33.6	7.5	0	3.7
gives me no control over my learning	0.9	7.5	14	51.4	24.3	1.9

7.4.1.4 Subjects' positive and negative comments reported in the open-ended question.

The responses to Question 5 were fairly uniform and were categorised into five broad types of positive, and three types of negative comments, as shown in the first columns of Tables 7.4 and 7.5 below. Each of these areas were comprised of similar elements and these are shown in the third columns of the same tables.

TABLE 7.4 SUBJECTS' POSITIVE COMMENTS ABOUT THE APPLICATION IN PERCENT.

Type of positive feature described	**Number of mentions**	**Specific areas within categories of positive features and the number of times each was mentioned.**
Useful for self study	38	Choice, 11; Flexibility, 9; Own speed, 6; Own time, 6; Control, 3; Variety, 3;
Motivation	38	Enjoyment, 14; Interest, 10; Motivation, 9; Entertainment, 5.
Features of multimedia	37	Ease of use, 16; Combination of elements, 7; Types of exercises; 6, Video, 6, Subtitles, 2.
Useful for learning	32	Listening comprehension, 9; Vocabulary, 9; General, 7; Correction, 4; Grammar, 3.
General	26	Like computers, 17, Change, 9,

Subjects commented on the application's potential to be a useful self-study tool, with statements such as *'I can choose what I want'*. The motivating potential was highlighted with responses such as *'It's motivating →picture + listening + exercises = "alive"!'*. Positive comments focused on specific features of the application were noted in 37 replies, e.g., *'It's very easy to use it'*. Comments on

its contribution to language learning received 32 mentions e.g., *'useful for improving listening comprehension'*. General positive comments e.g. *'it's very informative'*, and *'clear'*, made up the remainder.

TABLE 7.5 SUBJECTS' NEGATIVE COMMENTS ABOUT THE APPLICATION IN PERCENT.

Type of negative feature described	**Number of mentions**	**Specific areas within the types of negative features and the number of times each was mentioned.**
Performance of the computer	31	Speed of the computer, 29; Quality of the video, 2.
Using a computer	25	Dislike using computers per se, 9; Access to CD-ROM, 6; working alone, 4; eye strain, 4; Headphones, 2
Design features.	23	Content, 9; not easy to use, 6; subtitles, 4; no talk, 2; answers given, 2.

Table 7.5 shows the negative responses to the application. These again were broadly homogenous and were divided into the three areas shown in column 1 of the table. The performance of the computer was mentioned negatively by 31 subjects. The speed of the program, in terms of how long it took to move between activities, irritated many learners, e.g. *'It is slow when you want to change or move to another exercise'*. The processors used were 33 MHz. Negative reactions to using computers was the next most frequent response, 25 subjects, e.g. *'boring, I don't like working with computers'*, and there were also negative responses to some of the elements that comprised this particular program *'subject was boring'*.

7.4.2 Types of learners and differences in attitudes to the application.

To test hypotheses 2 (a) and (b) the responses from Questions 1, 2 and 3 were statistically associated with the responses to Question 4[1]. Pearson chi square values of significance were calculated using the SPSS. Table 7.6 below shows the significant associations between types of learners and their attitudes to the application. Significance is $p < 0.1$ and highly significant values are those < 0.01. The non-significant p values have not been given.

TABLE 7.6 SIGNIFICANT P. VALUES OF PEARSON CHI-SQUARE TESTS OF ASSOCIATION BETWEEN QUESTIONS 1, 2 AND 3 (COLUMN 1) AND QUESTION 4 (P<0.1 *, P<0.01 **).

	Confident	Not confident	Relaxed	Not relaxed	Good listeners	Bad listeners	Frequent self - study	Frequent listeners	Non frequent listeners
useful		0.02645							
easy	0.0028				0.08794				
not complicated								0.01628	
interesting	0.01241				0.04352		0.04352		
motivating				0.0879					
fun						0.09348			
improve listening comprehension									0.08154
improve English						0.04808			
won't make me study more							0.03856		
gives me more flexibility							0.08735		
gives me useful feedback							0.01241	0.0630	
disagree it is a waste of time	0.06878							0.04916	
gives me more control over my learning		0.02690	0.0318				0.06613		

Hypotheses 2 (a) and (b) proposed that different types of learners would have different attitudes to the application, more specifically that it would appeal more

to the less confident, less relaxed, and less able listeners. It was also hypothesised that stronger positive attitudes would be held by those learners who studied independently and practised their listening infrequently. These hypothesises were only partially supported by the results.

There are significant associations between those with a positive view of themselves as listeners and attitudes to the application that regarded it as being *'easy', 'not complicated'* and *'interesting'*. Perhaps this reflects the ability of such learners to work successfully with the listening tasks. There are also significant associations between those with a less positive view of themselves as listeners and attitudes to the application as being *'useful', 'fun"* and *'motivating'*. It may be that the application could provide a tool that is seen by the less confident listeners as a more appealing way to study than other traditional means.

The hypothesis that there would be significant associations between learners who studied or listened alone, infrequently and those who viewed the application as an effective learning tool, was to some extent confirmed by the data. There was a significant association between those who did not practise listening alone and the view that the application would *'improve listening comprehension'*. There was a similar association between those who regarded themselves as bad listeners and the view that the application multimedia would be able *'to improve their English'*.

Those who classified themselves as frequent independent learners were significantly associated with an appreciation of some of the autonomous learning

characteristics of the application, with significant associations along the dimensions of *'flexibility'*, *'provision of feedback'* and *'control over learning'*. This indicates that the application was appreciated as a self-study device.

In summary, there is some evidence in the data to suggest that those who regard themselves as ineffective listeners, and those who are infrequent independent learners, see the application as an effective language development tool. It would also appear to be seen as *'fun'*, *'motivating'* and *'useful'* by those who have a less positive view of their listening ability.

7.4.3 Observations of the sessions.

Observational feedback from the multimedia sessions indicated that subjects were engaged, active, attentive and interested in the application. Observers reported that forty-five minutes seemed a sufficient length of time to work on the program, as subjects' concentration appeared to be waning towards the end. This is corroborated by some of the negative responses in Table 7.5.

7.4.4 Use of the application after the introductory session.

Records were kept of the number of times that the CD-ROM was borrowed from the self-access centre after the introductory sessions, as subjects had been encouraged to use it independently. The number of recorded borrowings over

the semester was 3 from a potential 109 subjects. No attempt was made to investigate why, having reported so positively on the application, subsequently it was not used autonomously by the subjects. It may be that subjects were more interested in working on materials directly related to their assignments, they may have had little spare time or been uncertain how to acquire and set up the application. The lack of follow-up use of the application does, however, cast some doubt on the overwhelmingly positive reactions reported above.

7.4.5 Comparison of multimedia with other learning tools.

Table 7.7, below, shows subjects' comparisons of the application with other learning aids. Column 1 shows the number of subjects who ranked the application as being most similar to the language learning tool on the left. Most saw it as a *'tool'*, none as most similar to a *'book'*. *'Game'* was the second most popular choice indicating the multimedia experience was seen as fun.

TABLE 7.7 LEARNERS' RANKING OF HOW SIMILAR THE APPLICATION WAS TO OTHER LEARNING DEVICES AS RANKED FROM 1 TO 5

	Number of times ranked in this order					
	1	2	3	4	5	No replies
Tool	42.1	13.1	11.2	5.6	6.5	21.5
Game	20.6	16.8	14	21.3	8.4	18.7
Teacher	16.8	6.5	15.9	8.4	27.1	25.2
Reference book	6.5	24.3	12.1	17.8	9.3	29.9
Book	0	9.3	29	13.1	18.7	29.9

7.5 Limitations of the data.

Some of the limitations of this study may affect any wider implications which could be drawn. The data reported here is strongly favourable to the use of this program. It is prudent to be cautious about data which relies on learners' evaluations of CALL software. As Higgins (1995) has pointed out, ultimately correlations have to be shown between "...success in the learning activity and success in real life" (1995, p.76). The validity and the reliability of the data may have been compromised by subjects telling you what they think you want to hear (e.g., Oller, 1983) and so interpretations of such strong evaluations may need to be backed up with other evidence.

Although the results are particularly positive, they only measure reactions after one, initial, supervised use. Future studies might need to measure attitudes over a period of time as subjects may become less enthusiastic after repeated use of the application. Attitudes may have been less positive if multimedia had replaced teacher contact time and became a mandatory part of the curriculum. There may also have been a novelty effect that increased the strength of positive feeling.

The subjects were of a specific type: advanced, European undergraduates studying on a University degree course. They might be supposed to be among the more sophisticated and motivated of language learners. They were also probably more computer literate than other language learners. The reactions of different types of learners operating in different institutions need to be recorded.

The study also centred on one multimedia program and generalisations from this study, which embrace all multimedia language learning applications, are impossible. Although the pedagogic design is considered sound, using different multimedia programs would have provided different data. There was also no record of which parts of the multimedia program learners explored and exploited. It may be that localised success, or lack of it, with the chosen tasks may have influenced opinions.

7.6 Summary.

The results support hypothesis 1 and lend some support to hypothesis 2. Hypothesis 1 proposed that subjects would have positive attitudes to a) this multimedia software, b) its use for developing listening comprehension and / or learning language and c) as a means for providing self-study opportunities. All were confirmed very strongly by the results. Hypothesis 2 proposed a significant association between less able subjects and positive attitudes to the multimedia application and this was partially confirmed. The number of follow up uses of the CD-ROM though proved very disappointing and positive attitudes were not translated into action.

7.7 Implications.

The implications of these results are discussed in the light of the hypothesised causal relationship between attitudes, motivation and SLA, and the different levels of motivation (Crookes and Schmidt, 1992) in the context of instructed SLA.

7.7.1 The application and motivation at the micro, classroom and syllabus levels.

Motivation at the micro level refers to its relationship with the cognitive processing of the second language stimuli, and implies that the more engaged learners are with the input then the more likely it is that learning will occur. Observation of the sessions showed learners were actively engaging with the application. The application *seemed to be motivating them to voluntarily attend* to the input. Attention was directed towards the tasks and maintained over the session. The questionnaire results showed that subjects believed strongly that it would be useful for learning and the reports may reflect that learners' retrospectively recognised that such processes were being invoked. The application had a high face-validity for language learning. The studies reported in later chapters investigate learning outcomes in more detail.

There is some evidence to suggest that the application may have an important role to play in helping the learning of those who are less confident about their listening abilities. Whilst more research is required to confirm this, it may be that multimedia can reach those learners which other means have yet to excite. These results confirm those of deFelix, Johnston and Schick (1990) about lower proficiency learners.

Motivation at the classroom level is affected by the tasks and activities in instructed SLA, and by materials, feedback and learners' self-perceptions. Subjects' general attitudes to the application were extremely positive in terms of interest, although this might have been due to the less orthodox nature of the material and by its variation from normal classroom study (see Crookes and Schmidt, 1992). Motivation at this level can be maintained by providing tasks at a skill level equal to the competence of the learners, and attitudes reflect a match between the difficulty of the material and learners' proficiency level. Feedback which directs learners' attention to successful performance is seen as affecting motivation and the feedback was adjudged useful. The interest and relevance of the materials is thought to affect motivation and they were adjudged interesting, useful and relevant.

It is believed that increased learner involvement in the decision-making process about their language learning results in increased motivation, and consequently in productivity. The application was rated highly for giving control, flexibility and being able to take into account subjects' learning speeds. The statements about its characteristics as to self-study material also showed positive evaluations. In

summary, if the relationship between attitudes, motivation and achievement in SLA is indeed causal then the data shows that use of the application should facilitate SLA.

7.7.2 Multimedia and language learning technology.

The language laboratory has served language learning for thirty years, although it has fallen a little out of favour of late. However, with computers now being able to deliver audio and video and the highly favourable attitudes of learners to such a delivery, it might be suggested that further investment in audio only language laboratories is misguided. A language laboratory comprised of multimedia PCs would be of similar cost and offer learners a far greater variety of learning opportunities. The data suggests, though, that the computers used to deliver multimedia should be powerful enough to match the software, if not this becomes a definite cause of learner frustration. A fast local area network (LAN) is crucial to a satisfactory delivery of multimedia.

Traditional facilities available in self-access centres include books, reference books, videos, audiotapes and CALL programs. The data gathered here confirms that multimedia programs have a place in such centres alongside the traditional tools. It suggests that multimedia may be among the most important tools that we have yet had for the provision of independent language learning, as it uses all the traditional elements of video, audio, and text but also provides the added

dimension of instant feedback. The data shows that the dimensions of choice, flexibility, and learning speed are all positively received by users.

7.7.3 The application as a part of the syllabus.

There is quite strong evidence here that this multimedia application merits inclusion as a formal element in the language learning curriculum. McCarthy (1996) described how the integration of CALL for the learning of grammar had been successfully achieved. The application certainly appears to have a high face-validity and the evidence gained from observation showed no major problems with its functionality. The results indicate that this multimedia program is suitable for both supervised and independent CALL sessions. This suitability is now investigated in the research study reported in the next chapter.

8. The Integration of the Multimedia Applications into the Curriculum.

8.1 Background.

8.1.1 Rationale for the integration of the multimedia applications into the curriculum.

A major factor in the decision to incorporate multimedia-based self-study into the curriculum was the positive response obtained from the research reported in the previous chapter. To successfully integrate any computer-based element into a language learning programme means matching appropriate software and hardware provision to pedagogically sound motives. Likewise, the innovation needs to have high learner face-validity (White, 1988) with learners being able to perceive this as relevant to their learning objectives. The evidence from the previous chapter indicated that these conditions would be met by such an innovation. There are no studies which report on such a curriculum innovation with multimedia.

There were several other localised factors of the specific learning context which provided further reasons for the integration of these multimedia applications into

the curriculum. Learners' opportunities to listen to authentic spoken business English in the context of institutionalised study were limited, although subjects were studying in the L2 country. Class contact time restrictions meant that guided practice in listening to business English was also limited. It was felt that subjects were not using their allocated self-study time in the most constructive fashion. Also, by allocating some of learners' self-study hours for the development of listening comprehension, more class contact time was made available for teacher intensive activities. The intended end result was that learners should use the multimedia software and be able to demonstrate this use through successful completion of a written test. An important intended outcome, only indirectly measurable, was that all learners would have undertaken individualised and guided practice in listening to business English, and, through interacting with the language input, may have increased their listening competence and store of language.

8.2 Hypotheses.

The study investigated subjects' attitudes and the applications' learning potential. Subjects' attitudes to the applications when used as a mandatory, assessed and extended self-study component of their course, as well as to the innovation itself, are covered by hypotheses 1 and 3. The investigation of the learning potential, in terms of the learning strategies used and subjects' performance on a test, is framed by hypotheses 2 and 4.

The hypotheses were that:

1. Subjects would have positive prospective and retrospective attitudes towards the use of these multimedia applications:
    a) as a formal part of their curriculum,
    b) as material for a formal assessment.

2. Subjects would retrospectively report using learning strategies with the applications which were useful language learning strategies.
3. Subjects would use the applications regularly over the semester.
4. Subjects' performance on the multimedia assignment would be equal to their performance on their other four assignments.

8.3 Method.

8.3.1 Subjects.

The subjects were 64 NNS undergraduate learners of business English studying a final year module in the School of Languages and European Studies at the University of Wolverhampton. They were enrolled on the final year of a degree in Business and Languages in the academic year of 1996-7. The group could be considered as homogenous as any group of language learners, they had been tested and placed using the *Oxford Placement Test* (Allen, 1992) and were at an

Advanced level, roughly equating to the level of the *Cambridge Advanced English* exam. Their nationalities were almost equally French, Spanish and German, with a few Dutch. All were computer literate. They comprised four separate classes.

8.3.2 Materials.

The materials used are presented in full in Appendices H, I, J and K. These were:

- a pre-assignment questionnaire which used the same attitudinal statements as the questionnaire in Chapter 7 (Appendix H),
- a post-assignment questionnaire which was a retrospective version of the pre-assignment questionnaire (Appendix I),
- a formal written test on the two CD-ROMs (Appendix J),
- a retrospective assignment evaluation (Appendix K)

8.4 Procedure.

8.4.1 Orientation session.

Subjects were introduced to the software during their two-hour class period in the 4th week of the 12-week semester. They were shown how to access the CD-

ROMs and how to use the software. They then used the CD-ROMs as they wished for the remainder of the class. During this session they were told about the assignment, how they would be examined on the material, and the assessment criteria. The CD-ROMs were available for subjects to borrow from the self-access centre and records were kept on the amount of borrowing. Following the lab session, subjects anonymously completed the pre-assignment questionnaire.

8.4.2 The assignment.

The written test was given at the end of semester. It lasted one and a half hours and was taken under exam conditions. It was marked by the researcher and cross-marked by a colleague. Disputed grades were discussed and a consensus reached. The test grades were compared with subjects' average grades from their other assignments completed in the semester. Immediately following the test subjects completed the post-assignment questionnaire. Two months later they completed the assignment evaluation questionnaire.

8.5 Results.

8.5.1 Attitudes to the multimedia applications before and after the assignment.

The results of the pre and post-test questionnaires, together with percentage of change, are displayed below in Table 8.1. Subjects were asked about their attitudes to using the multimedia software in four areas. These were:

- general attitudes,
- attitudes to its learning effectiveness,
- attitudes to using multimedia for self study,
- attitudes towards its use for an evaluated assignment.

TABLE 8.1 GENERAL ATTITUDES, ATTITUDES TO THE LEARNING POTENTIAL, ATTITUDES TO SELF-STUDY AND ATTITUDES TO THE USE OF THE MULTIMEDIA APPLICATION FOR AN ASSESSMENT, GIVEN IN PERCENTAGES FOR BEFORE, AFTER AND OF CHANGE.

a. General attitudes to the use of the applications.							
Attitudinal Element		*N*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
It will not be / was not motivating	Before	58	0.00	3.45	10.34	53.45	32.76
	After	45	2.22	24.44	35.56	24.44	13.33
	% change	--	2.22	21	25.21	-29.01	-19.43
It will be / was useful	Before	60	36.67	48.33	6.67	8.33	0.00
	After	43	11.36	45.45	29.55	9.09	4.55
	% change	--	-25.30	-2.88	22.88	0.76	4.55
It will be / was a waste of time	Before	58	3.45	0.00	13.79	37.93	44.83
	After	44	2.22	15.56	17.78	48.89	15.56
	% change	--	-1.23	15.56	3.98	10.96	-29.27
It will be / was difficult	Before	60	0.00	18.33	30.00	43.33	8.33
	After	48	0.00	12.24	22.45	51.02	14.29
	% change	--	0.00	-6.09	-7.55	7.69	5.95
It will be / was fun	Before	59	8.47	62.71	18.64	8.47	1.69
	After	48	0.00	37.78	31.11	22.22	8.89
	% change	--	-8.47	-24.08	13.17	11.98	7.4
It will be / was interesting	Before	55	21.82	65.45	9.09	3.64	0.00
	After	45	8.7	47.83	36.95	4.35	2.17
	% change	--	-13.12	-17.63	27.87	0.71	2.17
It will be / was complicated	Before	60	0	18.33	25	45	11.67
	After	45	2.17	10.87	32.61	41.3	13.04
	% change	--	2.17	-7.46	7.61	-3.7	1.38
b. Attitudes to the applications as effective language learning tools.							
It will be / was effective for developing my Business English.	Before	60	11.67	66.67	20.00	1.67	0.00
	After	46	4.35	17.39	60.87	17.39	0.00
	% change	--	-7.32	-49.28	40.87	15.72	0.00
It will improve / improved my listening comprehension	Before	56	35.71	53.57	10.71	0.00	0.00
	After	47	4.26	55.32	25.53	8.51	6.38
	% change	--	-31.46	1.75	14.82	8.51	6.38
It will improve / improved my knowledge of English e.g.:- vocabulary	Before	59	37.29	55.93	6.78	0.00	0.00
	After	44	4.26	63,83	25.53	4.26	2.13
	% change	--	-33.03	7.9	18.75	4.26	2.13
It will be / was relevant to me	Before	57	15.79	54.39	28.07	1.75	0.00
	After	42	7.14	45.24	38.1	7.14	2.38
	% change	--	-8.65	-9.15	10.03	5.39	2.38
It will improve / improved my English	Before	60	26.67	61.67	10	1.67	0
	After	46	2.17	47.83	39.13	8.7	2.17
	% change	--	-24.49	-13.84	29.13	7.03	2.17

c. Attitudes to the use of the applications as effective self-study tools.							
It will encourage / encouraged me to work alone more	Before	59	15.25	47.46	27.12	8.47	1.69
	After	46	2.17	32.61	32.61	28.26	4.35
	% change	--	-13.08	-14.85	5.49	19.79	2.65
It will give / gave me no control over my learning	Before	58	3.45	12.07	20.69	41.38	22.41
	After	46	2.17	15.22	39.13	41.3	2.17
	% change	--	-1.27	3.15	18.44	-0.07	-20.24
It will allow / allowed me to work at my own speed	Before	58	25.86	56.90	13.79	3.45	0.00
	After	46	15.22	65.22	13.04	6.52	0.00
	% change	--	-10.64	8.32	-0.75	3.07	0.00
It will be / was more useful than a teacher	Before	63	11.11	25.40	47.62	12.70	3.17
	After	47	6.38	14.89	36.17	31.91	10.64
	% change	--	-4.73	-10.5	-11.45	19.22	7.46
It will not be / was not flexible	Before	59	0.00	1.69	30.51	42.37	25.42
	After	44	0.00	13.68	43.18	34.09	9.09
	% change	--	0.00	11.98	12.67	-8.28	-16.33
It will give / gave me useful feedback	Before	58	13.79	60.34	12.07	13.79	0.00
	After	47	2.13	42.55	31.91	19.15	4.26
	% change	--	-11.67	-17.79	19.85	5.36	4.26
d. Attitudes to the use of the applications for an assignment							
It will be / was an interesting assignment	Before	59	16.95	40.68	22.03	11.86	8.47
	After	46	4.35	43.48	30.43	15.22	6.52
	% change	--	-12.6	2.8	8.4	3.35	-1.95
I will do / did well at this assignment	Before	61	16.39	45.90	36.07	1.64	0.00
	After	44	4.55	20.45	43.18	29.55	2.27
	% change	--	-11.85	-25.45	7.12	27.91	2.27
I will have / had problems with this assignment	Before	59	0.00	6.78	38.98	40.68	13.56
	After	42	2.38	19.05	40.48	33.33	4.76
	% change	--	2.38	12.27	1.49	-7.34	-8.8

The Before rows in Table 8.1 (a) show that initial subject reactions were extremely positive. For example, more than 80% thought it would be *'useful'*, disagreed that it would be *'a waste of time'*, and more than 75% thought it would be *'interesting'*. There was strong initial evidence to justify the use of multimedia as a mandatory part of the course and these results mirrored the findings reported in Chapter 7.

However, post-test reactions showed a marked decrease in positive responses across all statements. For example, for *'usefulness'* 27% had shifted away from "strongly agreeing" and 23 % more were neutral, 31% moved away from "strongly disagreeing" that it would be *'a waste of time'*, and 28 % more were neutral on it being *'interesting'*. Nevertheless, even directly after the test a slight majority displayed positive attitudes with 54% strongly agreeing or agreeing that it was *'useful'* and was *'interesting'*, and with 63% strongly disagreeing or disagreeing that it was *'a waste of time'*. Attitudes to the multimedia applications after the assignment remained just on the positive side, but much less strongly so.

The Before rows in Table 1 (b) show that initial attitudes to the learning potential of these applications were extremely positive. For example, 77% agreeing it would be *'effective for developing business English'*, 88% agreeing it would *'improve listening comprehension'* and 92% agreeing it would *'improve knowledge of English'*. The applications seemed to have high learner face-validity for learning potential, again mirroring the findings in Chapter 7.

However, the post-test questionnaire data show a marked decrease in positive reactions. As to effectiveness in *'developing my business English'* 40% more were now neutral, 33% less strongly agreed it *'improved listening comprehension'*, and 35% less strongly agreed it *'improved knowledge of English'*. Despite the very noticeable decrease in positive evaluations, the majority were still slightly on the positive side of neutral. For example, 48 % agreed it "*improved their English*", 58% agreed it "*improved their listening comprehension*", and 67% that it had "*improved their knowledge of English*".

Figures in the Before and After rows in Table 8.1 (c), showing initial and post-test attitudes to the multimedia software as a self-study tool reveal a similar pattern. Initial reactions being very positive as in Chapter 7, and post-test attitudes showing a marked decrease in the strength of positiveness, but still remaining for the most part slightly favourable. A notable exception is the item '*more useful than listening classes with a teacher*' with post-test results showing a clear majority (42%) strongly disagreeing that this was the case.

Table 8.1 (d) gives subjects' opinions on using the applications as an assessed part of the module and similar trends can be seen. Strong initial favourable attitudes, a shift to much less favourable attitudes in post-test data, but overall attitudes remaining slightly on the positive side. For example, 35 % disagreeing they had '*problems*', and 46% agreeing it was '*an interesting assignment*'. The implications of these changes in attitudes are discussed in greater depth in 8.9.1, below.

8.5.2 The subjects' likes and dislikes about using the CD-ROMs for an assignment.

Summaries of responses to the open-ended questions on likes and dislikes, together with representative comments, appear below in Tables 8.2 and 8.3. These fell into a cluster of five areas for likes in the pre-assignment questionnaires, but only three in the post-assignment questionnaires. The dislikes

showed the reverse pattern with only three areas of dislike mentioned before the assignment, but these had grown to six in the post-assignment questionnaire.

TABLE 8.2 THE TYPES AND NUMBER OF "LIKES" MENTIONED BY SUBJECTS BEFORE AND AFTER THEIR ASSIGNMENT

Initial comments			**Post-assignment comments**		
Type of "like"	***N***	**Examples of subjects' comments**	**Type of "like"**	***N***	**Examples of subjects' comments**
Language Learning	33	Possibility to watch videos and practice your grammar at the same time I can check my answers	Language Learning	20	helpful to learn vocabulary gave me useful feedback
Computers	17	I like computers More interesting to work with computers	Self-Study	17	realising that learning on my own was quite efficient
Self-Study	14	You can work whenever you want I will take the decisions of what to do	General	8	I can use it for another module
Motivation	11	It's something different I think it's very interessant (sic)	Motivation	4	variety
General	3	Different studying conditions	Computers	4	learning more of working with a computer

TABLE 8.3 THE TYPES AND NUMBER OF "DISLIKES" MENTIONED BY SUBJECTS BEFORE AND AFTER THEIR ASSIGNMENT

Initial comments			**Post-assignment comments**		
Type of "dislike"	***N***	**Examples of subjects' comments**	**Type of "dislike"**	***N***	**Examples of subjects' *comments***
Computers	8	Watching the screen for a couple of hours; Computers not available everywhere	Computers	15	Limited availability of the PCs; Computer room too crowded; I finished with tired vision; Not sufficient headphones
Self- Study	8	You have to work alone I'll be obliged to come in my free time	Self- Study	8	Lack of time, Not flexible as I do not have a computer at home
General	5	Exams - nervous It's more work	Exam element	7	The necessity to have memorised for the exam, To study CDs as part of an exam
			Motivation	6	Not motivating; It's boring after 2 hours
			Language Learning	6	Completely irrelevant Not relevant to improve business English
			General	2	I don't have to know about these companies

In both initial and post-assignment questionnaires the language learning potential was clearly identified as the major "like", although with less frequency in post-test reports. The chance to use computers was valued initially, but not reported in the post-assignment questionnaires. In post-assignment reports self-study was cited more frequently, although the motivational aspect was not as frequently cited. As for dislikes, mention of using computers had sharply increased. This might be explained by the hardware availability clashing with the patterns of use

as depicted below in Chart 8.1. Mentions of dislike of the exam came up in post-test survey, as did the time involved in undertaking any self-study.

8.5.3 Learners' strategies with the multimedia software.

A summary of subjects' self-reports on the strategies they had used with the software, with illustrative comments, are shown in Table 8.4, below. Again replies were fairly homogenous and nine main strategies were discernible.

TABLE 8.4 THE TYPES AND NUMBER OF STRATEGIES REPORTED USED WHILST STUDYING WITH THE APPLICATIONS

Strategy type reported as used whilst studying with the multimedia	No. of mentions	Examples of subjects' strategy reports
Watching / Listening	21	I watched and listened; I watched the video; I just watched the video once
Doing the comprehension exercises	18	I did the exercises at B and C levels; I made the general exercises
Note taking summaries	12	I take some notes of what the persons were talking about At the end I wrote a summary to each video when I saw it whole Wrote down notes from the video
Writing down all the transcript	10	I wrote down all the transcript; I wrote the script
Watch with subtitles	9	I listen the conversations with subtitles
Vocabulary exercises	6	I have seen the vocabulary exercises; I looked at the vocabulary especially
Using the on-line glossary	6	I tried to understand the glossary; I looked up words that weren't yet familiar in glossary
Grammar exercises	3	Grammar exercises; I did the grammar tasks
Printing out	3	I printed the transcript; I printed exercises I had problems with;
Watched without the subtitles	3	I watched without subtitles; I heard the whole scene without any subtitles

These strategies need to be considered in the light of subjects' objectives, which were the successful completion of a written exam. Most strategies reported, apart from one, might be considered useful language learning strategies in their own right. Note-taking, watching the authentic video, using the subtitles to confirm and to check comprehension, doing interactive grammar and vocabulary tasks and using the glossary resource, might all be viewed as beneficial language learning activities. Writing down the whole transcript however might be considered as a useful exam passing strategy, enabling revision when the computers were not available, but probably not as a time-effective language learning strategy.

8.5.4 The patterns of use of the multimedia software.

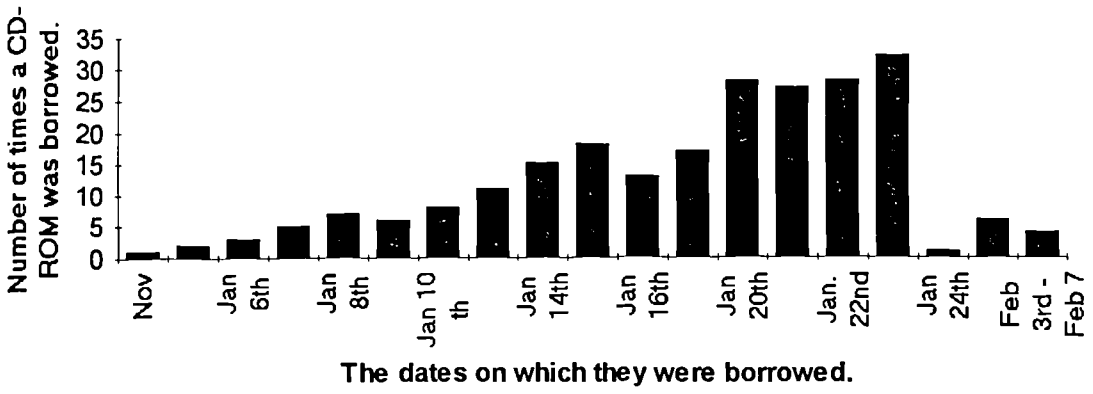


Figure 8.1 The amount and dates of borrowing of the multimedia software

The pattern of borrowing of the software is shown in Chart 8.1. It indicates that after introduction to the assignment and the software in November there were very few users until the time the test approached in January. This was not how subjects were encouraged to approach the use of the CD-ROMs, they were advised to use them for an hour per week. Despite extremely favourable initial reactions to the value of multimedia, subjects did not then make use of it until the test loomed. This pattern seems to contradict the initial evaluation of the usefulness and effectiveness of multimedia. However, it may be that subjects thought they were going to have to use the software anyway and so they might as well leave it until nearer the time of the test. It may also be that the recall element of the test meant use was deferred. Interestingly though, there were continued borrowings after the test had been completed on January 24th. The implications of the pattern of borrowing is discussed in the context of the change of attitudes, the use of multimedia in the curriculum and for formal tests in 8.9, below.

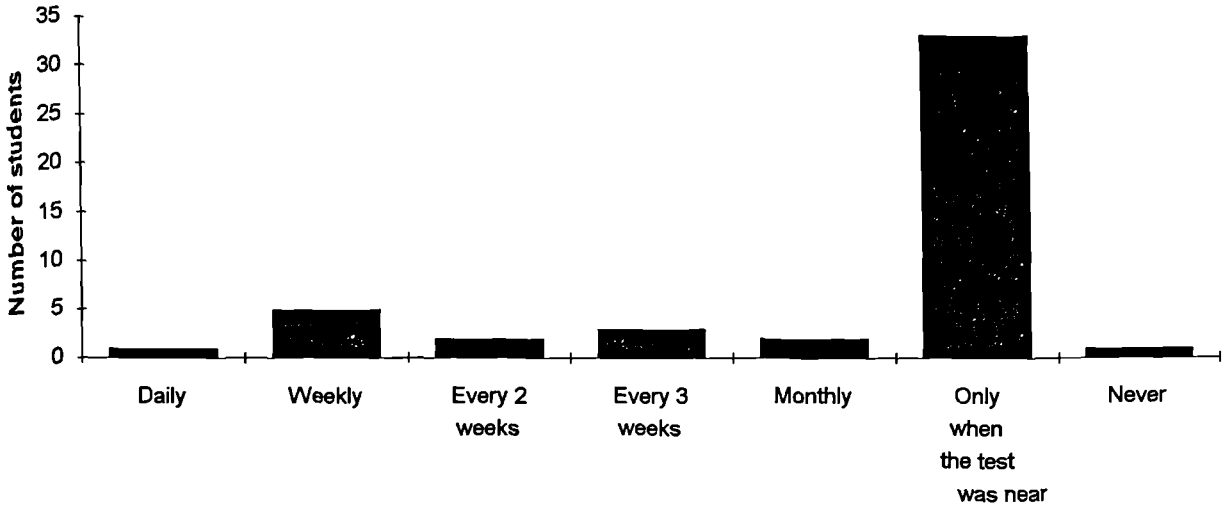


Figure 8.2 Subjects' self-reports about their frequency of use of the software.

The frequency of borrowing and subjects' reports on the time spent using the software are shown in Charts 8.2 above and 8.3 below. These again reveal patterns of use connected to exam preparation. The majority report only using it when the exam was approaching. The average amount of time spent using the software at each session is probably larger than that which might be viewed as productive and shows exam-oriented strategies. The implications of the data in these two charts are discussed in the context of the change in subjects' attitudes and the optimum ways in which multimedia might be used in institutional language learning, in Section 9 below.

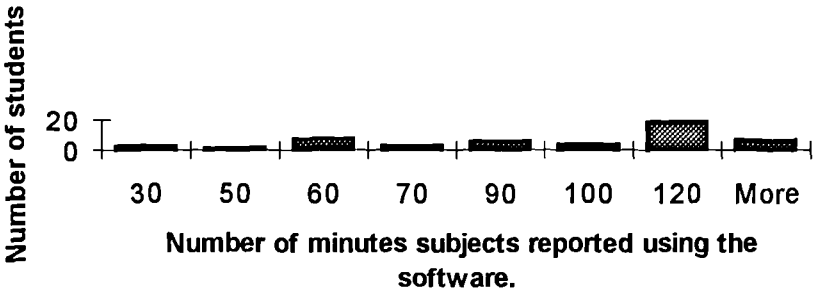


Figure 8.3 Subjects' self reports of time spent using the software

8.5.5 Comparison of subjects' performance on the multimedia test with other semester scores.

Table 8.5 compares grades achieved on this assignment with those achieved on the other four assignments set within this module showing them to be on average 0.73 of a grade lower. The standard deviation from the mean was also higher, however *t* tests showed that the grades had not come from a different sample.

TABLE 8.5 GRADES ON THE MULTIMEDIA TEST COMPARED TO AVERAGE GRADES OVER OTHER ASSIGNMENTS (* NOT SIGNIFICANT AT P>.05)

	For the other four assignments (max. = 16)	**On the multimedia assignment (max. = 16)**	**Difference**
Average student score	10.59	9.86	- 0.73
Standard deviation	2.11	3.21	----------
T test	1.527*	-----	

8.5.6 Retrospective evaluations of the assignment.

As can be seen from Table 8.6, in retrospective consideration of the multimedia-based assignment alongside the other four assignments taken during the semester, subjects rated the multimedia assignment as the least favourable in all but two of the categories. It was rated lowest in terms of the two learning items e.g., *'improved your skills, written or listening, the most'* and *'learnt most new language from'*. It was rated the most *'boring', 'least motivating', 'least enjoyable'* and *'least relevant'*. Most damningly of all it was clearly the assignment that subjects would *'least like to repeat'*. The use of multimedia applications in language assessments is discussed in greater detail in 8.9.3, below.

TABLE 8.6 SUBJECTS' RETROSPECTIVE RATINGS OF THEIR FIVE ASSIGNMENTS DURING SEMESTER EXPRESSED IN OVERALL MEANS (N = 44) (1 = MOST 5 = LEAST)

	The five assignments undertaken by subjects during the semester				
Criteria	1	2	3	4	CD-ROM
Improved your skills, written or listening, the most	2.19	2.71	2.52	3.00	3.26
Learnt most new language from	2.81	2.90	2.77	2.68	3.03
Easy	3.19	2.58	3.10	2.97	3.13
Involved most work	2.65	3.16	3.10	2.45	2.65
Boring	3.68	3.61	3.71	3.19	2.61
Motivating	2.77	2.65	2.48	3.06	3.61
Enjoyed the most	2.87	2.68	2.81	3.13	3.68
Relevant to you	2.61	2.10	2.39	3.16	3.42
Would NOT like to do again	3.65	3.52	3.48	3.32	2.65

8.6 Limitations of the study.

There were limitations of this study. The numbers of responses to the post-assignment questionnaires were less than to the initial one, providing a smaller sample. The use of self-reports on strategy use might be questioned as subjects may have written what they might have guessed their teachers would have liked them to do with the software, and not what they actually did. Language testing specialists may question the validity and reliability of the test. No attempt was

made to measure and quantify any gains in learning. It was anticipated that this had happened for different learners in different ways. Finally, this study did not compare mandatory and assessed self-study using multimedia with that based around other types of materials such as videos or books.

8.7 Summary.

The data from this study did not confirm the hypotheses. Hypothesis 1, that subjects would have positive prospective and retrospective attitudes towards the use of the multimedia applications a) as a formal part of their curriculum and b) as material for a formal assessment, was only weakly confirmed by the questionnaire data and would have to be rejected on the results from retrospective assignment ratings.

Hypothesis 2 that subjects would report using learning strategies with multimedia which were useful language learning strategies was only partially confirmed, with evidence that some of the strategies used were not.

Hypothesis 3 that subjects would use the programs regularly over the semester and thus gain maximum benefit has to be rejected. Use was entirely exam-oriented.

Hypothesis 4 that subjects' performance on the multimedia assessment would be equal to their performance on their other five pieces of assessed work was confirmed with no significant difference found in grades.

8.8 Implications.

8.8.1 Changes in subjects' attitudes.

The data showed a noticeable shift in subjects' attitudes in all four dimensions measured; general attitudes to the applications, attitudes to the learning potential of the applications, as an effective self-study tool, and to the use of the software for a formal assessment. Attitudes shifted from being strongly positive to being just on the positive side. In addition, there were changes in subjects' likes and dislikes, most noticeably with '*using computers*' in the post-assignment reports being much less frequently noted as a like, and much more frequently noted as a dislike. This mirrors Englesberg's (1997) findings, where after 5 weeks learners became increasingly dissatisfied with using a multimedia application. This she attributed to a lack of match with learners' course goals and with the mechanical nature of the language activities, resulting from the application's lack of a firm theoretical basis.

There may be several explanations for this shift in attitudes. The first is probably due to the differences between the circumstances in subjects' initial session with

the software and the subsequent uses. Initially it was a change in routine from teacher-led classes and was the first contact with any multimedia application for most of the subjects, therefore a new and novel experience. In the introductory session subjects were not completely alone with the computers and if technical problems were encountered, then help was on-hand to solve them. Subjects used the software in the first session in order to familiarise themselves with its features and to learn how to use it, therefore they were under no pressure to demonstrate that they had learnt anything from it.

The second explanation for the shift may well be in difficulties encountered in the use of the software. As shown by the patterns of borrowing in Chart 8.1 there was at least a two month gap between the initial introduction and when subjects began to use the software in earnest. It is likely that many had forgotten the instructions on how to set up the software and or how to use it. There were also problems with the availability of the CD-ROMs, although there were twenty copies available at any one time, it appeared that the demand nearer the time of the assignment exceeded this. The *"Managing Quality"* CD-ROM could only be used on sixteen of the computers. and the pattern of borrowing shown in Chart 8.1 shows there may have been a greater demand for this in some days in January. The computer laboratory was only open from nine o'clock to five o'clock and subjects would have had other obligations during these hours. Many subjects may also have preferred to study early in the morning or much later at night. They have such flexibility with book-based assignments. Various hardware problems were reported such as headphones breaking, CD-ROM drives malfunctioning and the .exe files were occasionally deleted from the hard discs.

There was technical support available from two technicians, but they had other duties to perform and were not able to advise on the task itself.

Another explanation for the decrease in enthusiasm for the applications is probably to be found in the externally imposed reason for their use. It is common knowledge that few of us enjoy being assessed and sitting exams. That the use of multimedia was obligatory for such a purpose probably affected attitudes to the software, subjects' motivation was extrinsic. Crookes and Schmidt (1992) note that extrinsic motivation may negatively affect intrinsic motivation. The pattern of borrowing shows that subjects chose to use the applications over a short period of time, and many for up to two hours. Such use probably contributed to a shift in attitudes as it was not the optimum way to exploit the applications. In addition, the nature of the test, a written exam which demanded that subjects needed to recall the information contained in the software, would have meant that not all subjects' study time for the assignment was spent working directly with the software. This is discussed further in 8.9.2 and 8.9.3, below.

8.8.2 The integration of the applications into the language curriculum.

The data gives some weak support to the idea that multimedia can be integrated into a formal language syllabus. The study did not replicate the study of McCarthy (1996) as to his success of integrating CALL grammar materials into the curriculum. The pattern of use involving heavy exploitation near to test time suggests that although learners valued their work with the software, it was not

being exploited in the optimum manner. There may well though be explanations for this pattern of use. Subjects had other study obligations, and other modules and assignments to complete. The exam demanded retention of information and thus use of the software nearer the time of the exam might have made more sense. Although borrowings continued after the exam, it is likely that these were motivated by subjects checking whether or not they had performed well on the test.

This pattern of use though gives rise to a predicament - interaction with multimedia might be thought to promote language learning, learners agree that it appears to be useful and report it to have been useful, yet patterns of use show that the resource was only heavily exploited around the test time. While such strategies are optimal for exam grades, less intense exploitation over a longer period of time might be thought to be more beneficial for developing listening comprehension and increasing language awareness. I suspect though that such maximisation of effort would have occurred near to any exam, whatever the material or mode of delivery and is the result of its use being mandatory. This still leaves the dilemmas of:

- how best to augment formal classes with multimedia?
- how to dove-tail it with self-study?
- how to use multimedia as a mandatory component of formal language courses?
- how to monitor its use?

8.8.3 The applications and formal assessment.

A formal test, linked to the software, was instigated to ensure its use as we believed this would both develop listening comprehension in an individualised environment, and facilitate language acquisition. As discussed in 8.9.1, above, not all of the time which subjects would have spent preparing themselves for the test would have been spent using the software. Subjects would also have needed to familiarise themselves with the content off-line. Learners' reactions to this mandatory use in itself were not negative, with for example 44% agreeing it was an "*interesting*" assignment. The test results yielded no significant differences from the other assignments undertaken during the semester. However, this assignment was compared unfavourably to the other four. There was a definite mismatch between the innovation's aims and the actual patterns and strategies of use of the material. Overall though, it appears that linking the multimedia software with an exam was successful in ensuring its use, but definitely less successful in ensuring the most productive kind of use. One suggestion to reconcile this mismatch might be to link use of the software to a different kind of assignment. Perhaps an exam that did not include any necessity to recall information or content would have been better received. Although the content matter was within the domain of business English, it may be that the nature of these two companies and the business topics were not attractive. If less concentrated, weekly use of the software is seen as more desirable, perhaps a series of fortnightly mini-tasks to be completed through exploration of the software could be considered. To ensure coverage of the language awareness material (business vocabulary, functions, and grammar), perhaps short,

fortnightly, formal tests of a limited range of items could have been used. Another suggestion would be an introspective written learner diary chronicling how they had used the software, what they had or had not learned from it, and how they felt their language awareness had been affected. This would ensure use and should encourage reflection on both the business English content and learning strategies.

8.8.4 The applications and their use in institutional language learning.

With current constraints on class sizes, contact hours and resources in British Higher Education, there are good reasons to consider the integration of computer-based materials which develop comprehension skills. Successful integration of multimedia will depend on the quality and appropriateness of the software, the hardware provision in terms of availability, reliability and speed, together with the links and balance between computer use and the curriculum. There are already some examples of successful formal integration of text-based computer language learning into institutional programmes, for example for the development of grammar for learners of French (McCarthy, 1996). There is evidence from this study to show that software selection, as measured by learner feedback, was appropriate but that access to the hardware was cited as being a major dislike and needs reconsideration. Overall though, it would appear that multimedia can be used alongside taught programs and take some pressure off contact time. It also seems fair to conclude that computers can now take a role in developing listening comprehension.

8.8.5 The multimedia applications and self-instruction in listening comprehension.

The provision of the opportunity for learners to autonomously develop their listening comprehension was one of the rationales behind this curriculum. Rost (1990) makes it clear that the promotion of effective self-instruction in listening, as opposed to merely enabling learners to listen and watch more, are not synonymous activities. Among the necessary elements of effective self-instruction in listening are:

- the use of authentic listening materials,
- appropriate tasks to accompany the authentic materials,
- the promotion of listening strategies suited to learner needs,
- the provision of appropriate feedback on learners' progress.

These four elements were all part of the multimedia software used in this study, authentic business English, tasks and feedback together with control of the environment and supporting resources adaptable to learners' strategies. The data show that it may have been successful with 53% agreeing it had '*improved their listening comprehension*' and general positive support for multimedia for self-study. Self-study also featured frequently in subjects' "likes", both before and after the assignment. Strategy reports indicated that the multimedia environment had been used in a variety of different ways, presumably matching its capabilities with the differing listening strategies and needs of the subjects. The study would also seem to justify the provision of multimedia facilities in self-access centres.

8.8.6 The use of the multimedia application and Second Language Acquisition.

It was assumed that the process of using the software would indirectly result in language development. This might have been facilitated by the conscious attention to input, for example Robinson (1995), by having had access to input that was comprehensible, for example Krashen (1985) or through negotiating their understanding of the input using the learning resources, for example Pica (1994), Chapelle (1997). That this might have happened is supported by several of the questionnaire results, with "language learning" reasons topping the list of likes in both pre and post-test feedback. There was strong agreement that both *"listening comprehension'* and *'knowledge of English'* had been developed. Further indirect evidence to suppose that language acquisition may have taken place is provided through the strategies learners reported using with the software, such as "task completion" and "note-taking". The following processes were also assumed to have taken place, but were not measured. Learners, through using the program, would have listened to authentic, unscripted business language as input, the kind of language thought to be the most beneficial kind (Anderson and Lynch, 1988; Rost 1990, p. 234). The comprehension support features of subtitles, glossary and tasks with feedback might have provided the means with which learners were able to negotiate their understanding of this input (Doughty, 1991a). The process of making the input comprehensible may in turn have contributed to language becoming "intake" (Pica, 1994). The listening skill is assumed to be "the most fundamental language skill" (Oxford 1993, p. 205) and it was hoped that using the multimedia programs might have contributed to the

development of learners' listening comprehension. Learner reports suggested that they believed it had. The next chapter investigates the effects of the use of the application on comprehension and recall.

9. The Effect of the Application on Levels of Comprehension and Language Recall.

9.1 Aims.

Would the use of the multimedia application *"Managing Quality"* result in higher levels of comprehension, and / or higher levels of language recall, than the use of audio and video cassettes with pen and paper? In this study subjects used the same pedagogic sequences and tasks linked to the same spoken input material, but delivered through audio, video and this application. The application was designed to be controlled by the users and had learning resources, in addition to the feedback, which were not available through video or audio, for example on-line definitions, subtitles to the text and the control of the digital video. To focus solely on the effect of the real-time feedback on listening comprehension, none of these additional learning resources were made available during this study. This maintained equality of input conditions with the audio and video treatments.

9.2 Hypotheses.

Four hypothesis were formulated:

1. Subjects' success rates on comprehension tasks would be greater while using this application than with audio or video plus pen and paper.
2. Subjects would recall more of the exact language of the input when it was delivered through the multimedia application.
3. Increased comprehension and language recall would be as a result of the availability of the instant feedback to performance on meaning-focused listening comprehension tasks would act to guide, confirm and realign subjects' reconstruction of the message;
4. Subjects would report the use of the application for listening comprehension to be positive, effective and motivating.

9.3 Methods.

9.3.1 Subjects.

The subjects were all final year NNS undergraduate students on a Business and Languages degree at the University of Wolverhampton, a similar population to that in the studies reported in the two previous chapters. They were all Europeans, either French, German or Spanish. Their ages ranged between 18 and 23. All subjects could be characterised as having an advanced level of English as

befits final year language undergraduates, although naturally there were individual variations in language ability. All were familiar with the Windows graphic user interface.

9.3.2 Materials.

Two sets of materials were used in the study. The first set were those used to measure levels of comprehension and language recall. The second collected information on subjects' evaluation of the experience.

9.3.2.1 Listening texts.

Six different video-based listening texts were selected from the CD-ROM "*Managing Quality*" (1995). Each text was between 1½ and 2 minutes long and an example is shown below in Figure 9.1. The content could be considered relevant to subjects as it concerned issues of management. The texts were authentic recordings, and although videoed for the purpose of creating language learning materials, they were not scripted or rehearsed. As can be seen from the example transcript below, all the features of natural spoken English, e.g.; pauses, false starts, hesitations, slips etc. are present. Two of the speakers had regional accents. Each of the six texts was to be delivered by each of three media: (i) an audiocassette recording, (ii) a videocassette recording, and (iii) through the multimedia application as a digital video clip.

Terry:- Roger, Roger Hargreaves you're company secretary and director at Ricoh. But I happen to know that you also have a number of other functions apart from those could you start off by telling us what those functions are?

Roger:- Within the structure of a Japanese organisation it's rather complex at times the way it operates I also have on a day to day basis general managership of the first manufacturing division that is half the manufacturing and also of the personnel division

Terry:- Well as you know we're here particularly to look at the manufacturing process the production process and particularly uh the quality aspects of that so could you tell us a little bit more about the first manufacturing responsibility that you hold here

Roger:- Within the company we have 2 manufacturing divisions which cover all our products the first manufacturing division provides the consumable that is the toner that is the optically active photo conducting part of the photocopier and also the toner that is the ink the places the image on to the paper. The first man .. the second manufacturing division produces all the photocopiers all the hardware, so I am in charge of the consumables part of the business.

Figure 9.1 The transcript of Text 1 as an example of the spoken texts used as input in the study

9.3.3 Data collection instruments.

9.3.3.1 Comprehension tasks.

Paper-based task sheets were prepared to accompany the audio and video delivery of each of these six listening texts. There were two sets of tasks for each text. There were pre-watching tasks which were to be completed before watching or listening to the texts. These aimed to raise subjects' linguistic and

schematic awareness of the texts they were to encounter. An example is shown in Figure 9.2 below.

The while-watching tasks were to be completed in real time whilst subjects were watching or listening to the text. The comprehension task sheets were used to record real time responses to the tasks when the listening texts were presented by video or audiocassette. For the comprehension tasks that were to be delivered by multimedia, both the pre-watching and the while-watching tasks were on the computer screen.

Five of the six while-watching comprehension tasks were of the True / False statement type as illustrated below in Figure 9.3, below. The other was an ordering task, which asked subjects to put six of the topics discussed in the video into the order in which they were heard. The written instructions for all six texts were the same in each of the three media. Three of the comprehension task sheets are included in Appendix L.

Before you listen / watch

Roger Hargreaves is going to tell us about his work at Ricoh. He mentions different products, jobs and divisions at Ricoh. Decide which are products, jobs and divisions.

personnel	_____	toner	_____	photocopiers	_____
manufacturing	_____	director	_____	consumables	_____
company secretary	_____	drums	_____		

Figure 9.2. The pre-listening / watching task which preceded Task 1.

While you listen / watch

Roger Hargreaves is going to tell Terry about his roles at Ricoh. Watch and decide if these 8 sentences are True or False. Put T or F next to each statement

1. Roger has other functions, as well as being company secretary and director.
2. Japanese company structure is not always simple to understand
3. He is manager of 50% of Ricoh's manufacturing capability
4. His approach to managership is personal
5. The second manufacturing division produces consumables
6. The optically active photo conducting part of the photocopier is the toner
7. The photocopiers are classed as hardware
8. He is responsible for all the hardware.

Figure 9.3. The while listening / watching task which accompanied Text 1

9.3.3.2 Language recall measures.

To measure subjects' recall of the language contained in the input, cloze passages were prepared for each of the six texts. The use of cloze passages as a measure of language recall has been used extensively e.g., Danan (1992). An example cloze passage from Text 1 is shown below in Figure 9.4. The words which were deleted from the texts were those which were also relevant to the completion of comprehension tasks. For example, the first deletion in the passage below is

"apart from" and comprehension of this phrase would assist subjects in answering True to the first comprehension statement "Roger has other functions, as well as being company secretary and director". Three of the six cloze passages are included in Appendix M.

Text 1.

Look at the following tapescript from the passage that you have just heard / watched. Write the exact missing words or words that were used in the text in the spaces.

Terry:- Roger, Roger Hargreaves you're company secretary and director at Ricoh. But I happen to know that you also have a number of other functions _____1_____ those could you start off by telling us what those functions are?

Roger:- Within the structure of a Japanese organisation it's rather _____2_____ at times the way it operates I also have on a day to day basis general managership of the first manufacturing division that is _____3____ the manufacturing and also of the _____4_____ division

Terry:- Well as you know we're here particularly to look at the manufacturing process the production process and particularly uh the quality aspects of that so could you tell us a little bit more about the first manufacturing responsibility that you hold here

Roger:- Within the company we have 2 manufacturing divisions which cover all our products the __5_____ manufacturing division provides the consumable that is the ___6_____ that is the optically active photo conducting part of the photocopier and also the toner that is the ink the places the image on to the paper. The first man .. the second manufacturing division produces all the photocopiers all the _____7_____, so I am in _____8_____ the consumables part of the business.

Answers were:- 1. apart from 2. complex 3. half 4. personnel 5. first 6. toner 7. hardware 8. charge of

Figure 9.4 The cloze test used to measure language recall from Text 1.

9.3.3.3 Learner evaluation.

In order to try to explain any differences that might occur in subjects' comprehension and recall success rates while using the three different media, a retrospective questionnaire was prepared. The use of retrospective self-reports has also been used extensively e.g., O'Malley, et al. 1989; Vogely 1995. The questionnaire is shown below in Figure 9.5. It used a 5 point Likert scale and had ten questions.

The ten questions were related to the hypotheses of the investigation and aimed to collect data on subjects' reactions to the specific features of multimedia-delivered listening work. Questions 1, 3 and 4 were designed to elicit subjects' opinions on the efficiency of multimedia. Question 1 asked about the display of one comprehension task question, rather than a list of many, as on the paper-based task sheets. Question 3 asked about the use of the mouse as opposed to pen and paper, and Question 4 elicited opinions about the provision of all of the task elements in the one place, the computer screen. Questions 2 and 7 measured subjects' perception of the impact of the on-going feedback to their comprehension of the texts. Questions 5 and 6 were included to ask about learning and remembering. The questions were couched in both negative and positive forms, e.g.; 2 and 4 were negatives. The last three questions asked subjects to compare the three delivery media as to:

- their contribution to comprehension,
- subjects' preferences,
- their contribution to acquisition.

Subjects were asked to articulate the reasons for these choices.

Please look at these statements about using this multimedia application - as opposed to audio or video and pen and paper- for listening comprehension, and tick one of the options.

1. Seeing only one question at a time on the computer helps to focus my listening.

Strongly Agree Agree Neutral Disagree Strongly Disagree

2. The instant feedback to my answers (the ticks and crosses) does not help me to understand while I am listening.

Strongly Agree Agree Neutral Disagree Strongly Disagree

3. It is easier to respond to the questions using a mouse than with pen and paper

Strongly Agree Agree Neutral Disagree Strongly Disagree

4. Having the questions, the language input and the area to put my answers all in one place (the computer screen) does not make listening comprehension easier.

Strongly Agree Agree Neutral Disagree Strongly Disagree

5. It is easier to remember language used on multimedia than TV or audio.

Strongly Agree Agree Neutral Disagree Strongly Disagree

6. I think I will learn more English using audiocassettes than by using multimedia.

Strongly Agree Agree Neutral Disagree Strongly Disagree

7. When my answers were wrong it helped me to understand the listening texts.

Strongly Agree Agree Neutral Disagree Strongly Disagree

A. Using which of these media most helps you understand the texts ? - please circle one.
Audio MM Video All equal

Why?

B. Which media do you prefer using for listening? - please circle one.
Audio MM Video All equal

Why?

C. Which media do you think helps you learn most new language?
All equal MM Video Audio

Why?

Thank you very much for your time . Paul Brett

Figure 9.5 The questionnaire given to subjects after their multimedia session.

9.4 Procedures.

Data was collected during class contact time in December 1995 and January 1996. The audio and video mode comprehension tasks were completed in one session. The multimedia-delivered tasks were completed later in a computer laboratory session. It had been planned to use a video laboratory where each student has headphones and an individual TV for the video material - but the lab caught fire on the day the research began and so one TV per whole class group was used! Each class group completed two different audio-delivered comprehension tasks, two different video-based comprehension tasks, and two different multimedia-delivered comprehension tasks. Each class completed each of the six comprehension and recall tasks. They used each of the three different media and completed two tasks on each.

9.4.1 Comprehension tasks.

The same procedures were used to collect the data in each of the three treatment conditions. Subjects were first given the pre-listening or watching task. When these were completed in paper-based format, the teacher provided the answers to the whole group. The pre-watching tasks and feedback in the multimedia sessions were via computer. Subjects heard or watched the spoken text once in each of the three delivery modes. The comprehension tasks were completed on paper while listening to the audiotape and watching the video. The multimedia tasks

were completed on screen by clicking the mouse, for tasks 1,2 3, 5 and 6, and by using a drag and drop exercise in task 4. Subjects' responses to the comprehension tasks were then collected in their paper format for the audio and video input, and ticks and crosses recorded on paper by the author from subjects' computer screens for the multimedia-delivered tasks.

9.4.2 Language recall tasks.

On completion of the comprehension tasks, subjects were given the appropriate cloze passage. Subjects were asked to complete the gaps with the exact word or words from the texts. In the scoring of these cloze tests only the exact words were counted as correct, although misspellings were ignored.

9.4.3 Evaluation questionnaire.

As a follow-up to the controlled conditions imposed for the research, subjects were allowed to explore the multimedia application in full. In this time they had access to the full range of features, namely the language awareness tasks, control of the video, the written subtitles, the glossary, and the different levels of comprehension tasks. At the end of this thirty-minute, subject-controlled session with the multimedia application, the questionnaire shown in Figure 9.5 was completed.

9.4.4 Statistical analysis procedures.

Raw total scores for the audio, video and multimedia comprehension tasks were compiled for each text. Likewise, the raw scores for success in recalling the exact words on the cloze passages was calculated. Using Excel 4 (Microsoft) the mean and standard deviation were calculated for each of the three treatment conditions. In order to compare the performance of the subjects in each of the three conditions, *t* tests were performed. This statistical procedure can be used to compare means of small, independent samples of varying sizes. Levels of significance were set at $p < 0.05$, or 95% certainty that the samples were different.

For the questionnaires the raw totals of responses on the Likert scales were calculated and converted to a percentage. Responses to the open-ended questions were recorded in a database, then grouped together according to the type of reasons offered.

9.5 Results.

9.5.1 Comprehension tasks.

Table 9.1 below shows the results of the comprehension tasks. Those completed in the multimedia environment show higher average success rates than those completed in the video and audio conditions, for four of the tasks (Nos. 1, 2, 3,

and 5). In task 6 the multimedia score is slightly less than that of the video, but in task 4 is notably lower than both the audio and video. *T* tests were performed to compare the means of the multimedia-delivered groups with those of the audio and video groups to see if these differences were significant at $p = < 0.05$. They proved to be so in four cases. These are marked with an ** below. The differences were also approaching significance in three instances and these are marked with *.

TABLE 9.1 THE SAMPLE SIZES, MEANS, STANDARD DEVIATIONS, AND *t* TEST SCORES (** $P < 0.05$) OF THE SIX COMPREHENSION TASKS GROUPED ACCORDING TO THE DELIVERY METHOD.

Text No.	Delivery Method	*N*	Max. Score	Mean	Mean Percent	*SD*	*t*
1.	Audio	12	8	4.17	52.08	2.21	2.268**
1.	Video	12	8	3.25	40.63	1.82	4.581**
1.	Multimedia	28	8	5.75	71.88	1.38	------
2.	Audio	12	7	4.25	60.71	1.36	0.417
2.	Video	13	7	4.00	57.14	1.96	1.314*
2.	Multimedia	17	7	4.53	64.71	2.24	------
3.	Audio	20	6	3.15	52.50	1.63	2.901**
3.	Video	12	6	3.75	62.50	1.29	1.612*
3.	Multimedia	12	6	4.42	73.61	0.79	------
4.	Audio	20	5	3.25	65.00	1.52	-1.172
4.	Video	12	5	3.33	66.67	1.67	-1.050
4.	Multimedia	12	5	2.42	48.39	1.16	------
5.	Audio	22	8	3.59	44.89	2.15	2.303**
5.	Video	20	8	5.10	63.75	1.21	0.458
5.	Multimedia	11	8	5.27	65.91	0.65	------
6.	Audio	12	6	2.08	32.72	1.68	1.432*
6.	Video	29	6	3.03	50.57	1.06	-0.173
6.	Multimedia	11	6	3.00	48.50	1.14	------

9.5.2 Recall.

Table 9.2 shows the results of the language recall cloze exercises. This was a difficult task with low overall scores as might be expected because subjects were given only one listen or watch of the text. Results indicated that the use of the multimedia application seemed to facilitate better recall in four of the tasks, nos. 1, 2, 3, 5, and slightly better recall in task no. 6. In task 4, the multimedia-delivery produced the lowest success rate. *t* tests were calculated to compare the means of the multimedia-delivered recall with the audio or video groups. The *t* tests showed significant differences between multimedia and audio in texts 1, 2 and 5, and significant differences between multimedia and video in texts 1 and 2.

TABLE 9.2 THE SAMPLE SIZES, MEANS, STANDARD DEVIATIONS, AND *t* TEST SCORES ($P < 0.05$) ON THE CLOZE TESTS FOR EACH OF THE SIX TEXTS ACCORDING TO THE DELIVERY METHOD.

Text No.	**Delivery Method**	***N***	**Max. Score**	**Mean**	**Mean Percent**	***SD***	***t***
1.	Audio	12	8	1.75	21.88	1.54	2.392*
1.	Video	12	8	1.50	18.75	0.67	3.044*
1.	Multimedia	28	8	3.89	48.66	2.73	------
2.	Audio	12	7	1.67	23.81	1.07	3.339*
2.	Video	13	7	0.77	10.99	0.83	1.835*
2.	Multimedia	17	7	2.94	42.02	2.22	------
3.	Audio	20	6	3.15	52.50	1.63	-2.295
3.	Video	12	6	3.75	62.50	1.29	-1.944
3.	Multimedia	12	6	4.42	73.61	0.79	------
4.	Audio	20	4	1.60	40.00	1.13	-0.921
4.	Video	12	4	1.92	47.92	1.47	-1.606
4.	Multimedia	12	4	1.17	29.17	1.22	------
5.	Audio	22	8	1.05	13.07	1.13	3.856*
5.	Video	20	8	3.05	38.13	1.47	-0.363
5.	Multimedia	11	8	2.91	36.36	1.22	------
6.	Audio	12	6	1.83	30.56	1.03	0.620
6.	Video	29	6	2.14	35.63	1.22	-0.182
6.	Multimedia	11	6	2.18	36.36	0.98	------

9.5.3 Evaluation.

Table 9.3 below shows the results of the post-use questionnaire. Questions 1, 2, 3, 4 and 7 were designed to elicit subjects' reactions to the features of multimedia that it was hypothesised might facilitate successful listening comprehension. Questions 1, 3 and 4 relate to the possible efficiency of multimedia which delivered everything in the same place, video picture with aural input, written tasks, and subjects' responses and feedback. Subjects seemed to appreciate such efficiency. Two questions, 2 and 7, asked for reactions to the instant feedback and answers showed conflicting opinions. Question 7 shows a total of 60.4% agreeing or strongly agreeing that feedback when task answers were wrong was a helpful feature. However, the replies to Question 2 show a total of 34.1% agreeing or strongly agreeing that feedback did not help, but 34% disagreeing or strongly disagreeing that it did not help. Although responses to question 7 indicate feedback may be helpful, the responses to question 2 are not as clearly supportive.

Questions 5 and 6 asked about remembering and learning from the multimedia application. No clear favourite emerged for remembering, but subjects indicated overwhelmingly that the use of the application was more likely to result in learning. The last three questions asked subjects to compare the three delivery media as to their contributions to understanding (Question 8), to preference for listening (Question 9) and to learning (Question 10). Multimedia was strongly favoured for understanding and learning, and slightly favoured for listening.

TABLE 9.3 SUBJECTS' RESPONSES TO THE QUESTIONNAIRE.

Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Seeing only one question at a time on the computer helps to focus my listening.	27.9	67.4	2.3	2.3	0
2. The instant feedback to my answers (the ticks and crosses) does not help me to understand while I am listening.	7.3	26.8	31.7	29.2	4.87
3. It is easier to respond to the questions using a mouse than with pen and paper	35.7	42.8	19.07	2.3	0
4. Having the questions, the language input and the area to put my answers all in one place (the computer screen) does not make listening comprehension easier.	4.5	11.3	15.9	52.27	15.9
5. It is easier to remember language used on multimedia than TV or audio.	7.1	30.9	33.3	25.5	2.3
6. I think I will learn more English using audiocassettes than by using multimedia.	0	4.6	20.9	60.46	13.9
7. When my answers were wrong it helped me to understand the listening texts.	2.3	58.1	13.9	25.5	0
	Audio	MM	Video	Same	
8. Using which of these most helps you understand the texts ? - (please circle one).	7.1	61.9	19.04	11.9	
9. Which do you prefer using for listening? - comprehension (please circle one).	19.5	41.46	31.7	7.3	
10. Which do you think helps you learn most new language?	12.19	70.73	12.19	4.87	

Table 9.4 below shows the responses to the open-ended parts of questions 8, 9 and 10, when subjects chose "multimedia" from the four options. The responses clearly show the features of multimedia which subjects believed would facilitate comprehension and learning. For example, the "combinations of elements" was mentioned in the answers to all the questions, and the dimension of "focus" was mentioned in Question 9 with regard to facilitating listening comprehension.

TABLE 9.4. SUBJECTS' RESPONSES TO THE QUESTION "WHY" WHEN THEY CHOSE MULTIMEDIA - FOLLOWING QUESTIONS 8, 9 AND 10.

8. Using which of these media most helps you understand these texts. Numbers of responses (and example replies) of those who circled multimedia.		
Feature of multimedia described	**No. of mentions**	**Examples of subjects' responses**
Combinations of the Learning features	10	- I have all in one audio, video and the exercises; - because I've got the texts and the answers in front of me on the screen
Pictures	5	- when I can see the expressions of the people I understand it better
Computer	3	- because I prefer using the computer
Interactivity	2	- because I can participate
Ease of use	1	- easier usage

9. Which media do you prefer using for listening? Numbers of responses (and example replies) of those who circled multimedia.

Feature of multimedia described	No. of mentions	Examples of subjects' responses
Focus	9	- I put in my answers and watch the video together - It helps you because it has the questions asked at each time
Combinations of the learning features	6	- you can use the subtitles and the images - possibility to stop and replay and answer again
Ease	2	- don't need anything else but the computer

10. Which media helps you learn most new language? Numbers of responses (and example replies) of those who circled multimedia.

Feature of multimedia described	No. of mentions	Examples of subjects' responses
Combinations of the learning features	22	- listening reading writing at the same time - you have everything in here (listening/writing) etc. - easier to put your answers when you hear the words on the screen
Choice	3	- you can do it at your own pace
Computers	2	- prefer working on PCs than video / audio

9.6 Limitations of the study.

Although these results show the use of the multimedia application resulted in higher comprehension rates and recall of language, mention should be made of some of the limitations of the study. There is no totally objective definition of

comprehension, and therefore none of the possible approaches to its measurement are going to be fully satisfactory. This study measured comprehension through performance on five sets of true / false statements and one 'put in the correct order' task. It may be that subjects had understood much more of the information supplied by the spoken texts than that which these tasks demanded. Perhaps, on the other hand, subjects had understood nothing else apart from the specific information needed to complete the tasks. The use of different measures of comprehension such as written or oral recall scripts might have yielded different results. The sample size is not necessarily large and is made up of subjects who are motivated, 'academic' learners who were also already familiar with the Windows interface. No test of listening comprehension or language proficiency was undertaken prior to the study to verify the degree of homogeneity of the subjects. The communicative listening tasks were all "transactional" involving transfer of information, rather than tasks aimed at interpretation of the information. The study is a 'snapshot' and a longitudinal study involving repeated uses of multimedia across a larger variety of text types may have produced different results.

9.7 Summary.

The data from this study seems to confirm each of the four hypotheses. Hypothesis 1 that subject success rates with comprehension tasks would be greater while using the multimedia application rather than audio or video plus pen and paper, found strong and significant support. Comprehension success rates

were significantly greater with multimedia in four of the six texts. Overall, the two types of video delivery, multimedia and videocassette, improved performance over a sound track only delivery. This confirms much of the research reporting increased comprehension through the use of video described in Chapter 3, for example Herron et al. (1995), Balatova (1994). It is worth pointing out that text 4 asked subjects to put a list of topics into the order in which they were mentioned. In its computer-delivered form this meant a "drag and drop" method of response. Success rates on this drag and drop task were an anomaly and it may be that this task demanded a more complex response than those needing only a mouse click. It is highly likely that completion of such a task distracted subjects from listening to the text. The "drag and drop" response requires accurate, manual dexterity and a lot of cognitive processing in the form of visual and motor monitoring. In addition, these results were probably influenced by the way that this question type was configured. If subjects dragged one of the numbers into an incorrect box then this automatically meant that two of the answers were wrong as, of course, a box filled with an incorrect answer negated it being complete with a correct answer.

Hypothesis 2 proposed that a greater success rate on the language recall task would result from use of the multimedia application. This was supported by the data showing that recall was greater following use of the multimedia application in four of the six texts. The *t* tests show that the differences in recall between audio and multimedia were statistically significant in half of the cases investigated. Corroborative data for this hypothesis was also partially provided

from the questionnaire results. It seems likely that better recall resulted from better original comprehension of the input text.

Hypothesis 3 predicted that the greater comparative success rate would be attributable to the unique features of the multimedia environment. These features were the provision of instant feedback in the form of ticks and crosses, which may have acted to guide, confirm and realign subjects' internal and on-going reconstruction of the message. There is support for this from the questionnaire responses, but they were not unanimous. Whether or not the instant feedback is supporting on-going comprehension is one of the questions investigated further in the study reported in the following chapter. There is quite strong support in the questionnaire responses (Questions 1, 3 and 4) for the view that the amalgamation of input, task, and feedback into one environment supported comprehension. There is further support from the open-ended replies to Questions 8, 9 and 10 with "combination of elements" and "focus" receiving the majority of mentions.

Hypothesis 4 stated that subjects' reactions to the use of the application for listening comprehension would be positive, and that they would see it as effective and motivating. This was supported by the data. The majority believed the application would aid memory of language and that an audio-only delivery was not as effective for learning new language.

9.8 Implications.

9.8.1 Efficiency of focus.

There may be certain gains in efficiency achieved through the use of a computer interface which contains all the pedagogic components of L2 listening comprehension tasks. It was certainly noticeable during the video plus pen and paper tasks that over half of the subjects did not actually watch the video clip, but looked at the written comprehension tasks on their papers. While completing the multimedia comprehension tasks only slight eye adjustments are needed between the video image and comprehension tasks. Using a mouse click to respond to a task is quicker than, for example, writing a T or an F for true and false, or writing a number on paper. The brevity of task response when this is a mouse click may free attention capacity and this can thus be redirected towards comprehension of the input. The explanation for subjects' less successful performance on task 4, which used the drag and drop exercise type, may also support this. As it was not as easy or quick to drag and drop as to just click on a mouse, then maybe completion of this task diverted attention away from the listening text and interfered with the listening comprehension process itself. In addition, the arrangement for the true / false statements in the application was such that only one of the 6, 7 or 8 statements per listening text was on screen at one time and this seemed to help to focus attention on the comprehension of that one element of the message.

9.8.2 The multimedia application, instant feedback and the monitoring of comprehension.

A further reason for the greater success rate on the multimedia comprehension tasks may be the instant feedback. Subjects received real-time ticks or crosses for their responses to all the parts of the tasks. It is suggested, for example by Oxford (1993, p.209), O'Malley et al. (1989), Buck (1992) that L2 listening involves the listener in constantly and continuously monitoring the evolving state of their comprehension. Thus, while listening to extended transactional discourse, listeners need to check upon their progressive and unfolding interpretation of the text, matching the new input with what has already been interpreted. Indeed O'Malley et al. (ibid.) suggest that the monitoring of understanding is a key strategy used by effective listeners. This application's instant confirmation or rejection of subjects' on-going interpretation of the meanings may serve to support the listening process. It provides such a monitoring facility by confirming or rejecting learners' up-dated interpretations. If wrong interpretations have been made then learners are made aware of these while listening. They then have the opportunity to derive a new set of assumptions based on the gap between the feedback and their original assumption. It is then possible to proceed to interpret the following spoken language input from a position of understanding rather than carrying forward flawed interpretations to the next part of the discourse. The feedback may have helped learners to notice that their developing interpretations were inaccurate and averted more serious comprehension breakdowns, or may have confirmed that interpretations were accurate. However, whether the provision of an on-going monitor via

multimedia will encourage the development of such self-monitoring strategies in real-life situations is another issue.

9.8.3 Comprehensibility of input, language recall and SLA.

Any explanation of the greater success in the cloze tests, and thus of language recall through the use of this application is going to be somewhat speculative. It is supposed that for language acquisition to occur learners need to be exposed to input which is comprehensible e.g., Krashen (1985) and Long (1985). It may be that the instant feedback, which funnels learners into an on-going accurate interpretation of the main communicative elements of the listening texts, has the effect of making such input more comprehensible. While also confirming or clarifying learners' representations of the texts, it might be that the comprehension tasks and their feedback combined to focus attention on the specific linguistic features that carried and signalled such meanings. As indicated earlier, the items selected for deletion in the cloze passages were central to the interpretations necessary for the True / False tasks. Tentatively, it may be that using such multimedia activities affords higher rates of comprehension through the provision of instant feedback and also through the efficiency gains of such an environment. Therefore exposure to language input that has been made comprehensible in this way might serve to encourage language recall and subsequent acquisition. This would be a productive area for further investigation.

9.8.4 Multimedia language laboratories and traditional language laboratories.

It would appear that the investment in, and provision of, multimedia software applications for listening might achieve a pay-off both in terms of quantifiable learner success rates and learner-perceived learning gains. It may be more effective for the development of listening comprehension than the traditional tools of the audio cassette player, language laboratory, or videocassettes, each combined with pen and paper. This suggests that investment in language laboratories may be less beneficial than that in multimedia computers. Ironically it would also appear that we have a self-study listening resource that achieves better results than its teacher-led counterpart! There is also evidence to support the development and production of more multimedia applications for listening comprehension. It suggests that further research might try to discover how the various pedagogic elements and combinations of learning support features in the multimedia provision e.g., task types, subtitles, and feedback, serve to differentially enhance comprehension.

9.8.5 Use of all the learning resources in this application.

The controlled nature of this study meant that the full range of learning resources in the multimedia application were not available during the research. Had subjects been able to exploit the other learning resources such as the subtitles to the video, the hotspots on words in the subtitles, or the glossary, then it seems

reasonable to conclude that their comprehension would have been greater. Likewise, had learners been able to control the input, by being able to start, stop, fast forward etc. in any of the three delivery modes, then comprehension would have been greater, for example Zhao (1997). In digital video format greater and more efficient control over input is possible than with audio or videotapes. In multimedia any rewind to the start is virtually instantaneous and the subtitles enable a quick and precise location of any part of the text. Doughty (1991a) linked such features of multimedia to the Negotiated Interaction Model of SLA. She pointed out that it is just such interactive resources placed under learners' control within multimedia applications which serve to replicate features of real-life negotiated interaction namely "requesting clarification, confirming understanding, and checking for comprehension." (1991a, p12). The increased success of subjects using the multimedia environment seems to confirm Doughty's position.

10. The Effects of the Use of the Additional Learning Resources on Levels of Comprehension.

The results described in the previous chapter showed that the multimedia application facilitated gains in comprehension, probably due to the efficiency of the computer environment, and through the availability of feedback to the tasks. This chapter adds two further dimensions to the results reported in the previous chapter:

- the availability of subtitles,
- learner control of all the support features.

One of the claims of multimedia is that the effect of the "multi" on comprehension might be greater than the sum of the parts. Hoogeveen (1996) terms this the level of multimediality, which should encourage greater sense stimulation, a higher level of arousal, more involvement and greater recognition of content and information. Additionally, many educational multimedia theorists e.g., Mayer (1997) also believe there to be a congruence effect when redundant media are used. Input can be rendered through different media, but it is important for the reduction of the processing load that the media use different processing channels. Thus sound and text use the acoustic and visual channels, but text and pictures both use the visual channel. Other scholars though, e.g., Sweller (1994)

have proposed that amalgamating many media may, in fact, have the opposite effect and cause overstimulation, cognitive overload, distraction and fatigue.

10.1 Hypotheses.

The aim of this sub-study was to investigate the effects on comprehension of the use of the different combinations of learning support resources available within the *Managing Quality* application. The resources which accompanied the video clips were the meaning-focused tasks and the subtitles. The design of the application enabled users to freely exploit any combinations of these three. Data was collected on how the use of combinations of these three would affect subjects' comprehension as measured by their recall of the ideas in the input, and also their re-use of language from the input.

The hypotheses were:

Subjects who had the three comprehension support resources of video, subtitles and tasks with feedback would be able to:

1. recall more of the ideas contained in the input.
2. recall more of the original language used in the input.

10.2 Methods.

10.2.1 Subjects.

Subjects were all final year undergraduates at the University of Wolverhampton taking modules in business English. The nationalities of the subjects were almost equally German, Spanish and French with a few Dutch speakers. The group could be considered as homogenous as any group of language learners, they had been tested and placed using the *Oxford Placement Test* (Allen, 1992), and were at an Advanced level, roughly equating to the level of the *Cambridge Advanced English* exam. Four classes of learners were randomly selected for the study, two classes of 13 and two classes of 14, giving a sample size of 54.

10.2.2. Materials.

10.2.2.1 The multimedia interface

This study used a clip from "*Managing Quality*" (1995). The learner interface of the clip used is shown below in Figure 10.1. The subtitles are beneath the video on the right, and the comprehension tasks on the left, with the feedback below.

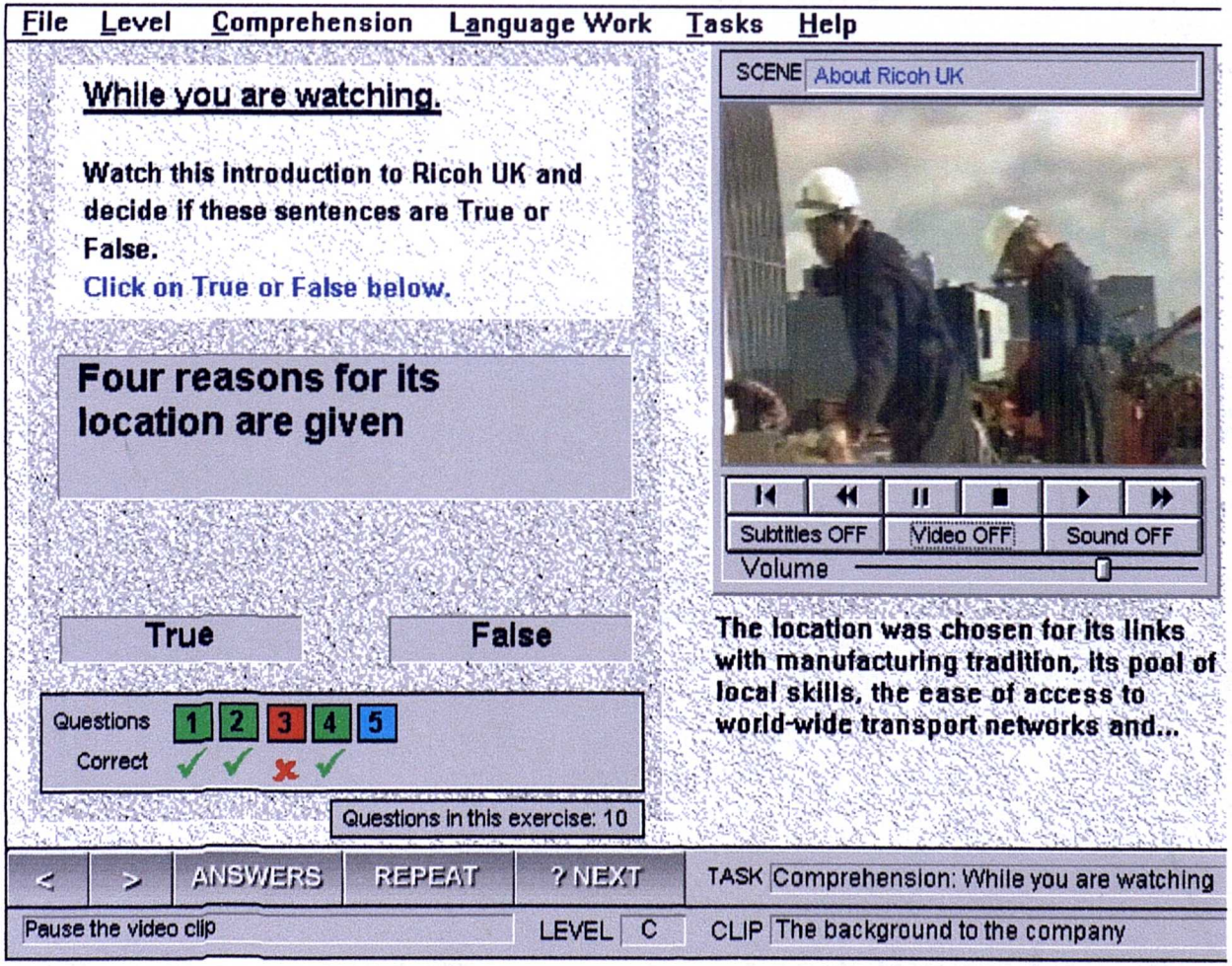


Figure 10.1 The interface of 'Managing Quality' the application used in this study.

10.2.2.2 The video text and subtitles.

The complete spoken text of the video clip is given below in Figure 10.2. It was a videoed description by a quality control manager of his work experiences in British and Japanese companies. He had a slight Irish accent. The clip was 2 minutes and 5 seconds long. The content could be considered relevant and interesting for the subjects. The recording was spontaneous, neither rehearsed nor scripted, and can be considered authentic. The text of the clip appeared as subtitles beneath the video image. The subtitles automatically scrolled through in synch with the video image. The video clip and the equivalent subtitles could be controlled by subjects, with stop, rewind, pause, and fast forward options.

Terry:- I know that Ricoh in its company policy makes a great deal of uh of fulfilment of the of the job satisfaction that the workforce obtains from playing its part in the production process. How would you evaluate your own job with regard to satisfaction an

Joe:- I think having worked for a British company, I worked for Lucas industries for a number of years and I worked abroad for 5 years and came back to the UK in 1990 and came to work for Ricoh and I find that probably the within the Japanese company we have more involvement and when you have more involvement and some say in the running of the company as well you get greater job satisfaction and I think it's safe to say that all people within Ricoh from the staff person to senior management gets involved in the daily quality control of the product and I think that's a self fulfilment in itself

Terry:- Did you find when you came to Ricoh that the uh the attitude of management with respect to quality took some time to adjust to or was it something that came easily to you

Joe:- Well I was fortunate, um I said I worked for Lucas industries and Lucas industries had the part of the division I worked for had zero defects we couldn't afford to allow brakes to get on to a vehicle umm coming in to Ricoh although there some difference uh it wasn't a great jump for me umm but yes there were changes there were things that I had to adapt to to Japanese ways of doing things um questioning more why the defect and putting it right first time uh and these are differences that you find within a Japanese company that you don't sometimes have in a British company even within Lucas industries but Lucas industries for me was a good training ground so I was fortunate.

Figure 10.2 The text of the spoken input

10.2.2.3 The tasks

The comprehension task which accompanied the text is shown below in Figure 10.3. The task consists of eight true / false statements, each appeared individually and sequentially on-screen. The next statement was displayed after subjects had clicked on either 'true' or 'false'. These were not available to be read in advance, nor were they linked to the place in the video where the information was conveyed. Feedback on task success was with green ticks and red crosses. The treatment groups with tasks available could repeat them as desired.

1. Ricoh's company policy promotes job satisfaction among its employees.
2. Joe worked abroad before working for Lucas.
3. Joe believes you have more involvement in the job with a British company.
4. He says all levels of employees contribute to quality control.
5. Terry asks about his attitude to the management at Ricoh.
6. Joe says Ricoh was not that different from his previous companies.
7. Ricoh corrects any problems immediately.
8. He thinks working at Lucas prepared him well for Ricoh.

Figure 10.3 The eight true / false statements which made up the listening comprehension task

10.2.3 Procedure

10.2.3.1 Introduction to the software.

The study was conducted in a computer laboratory during a regular class period of 90 minutes. Subjects were introduced to the multimedia application by the researcher and all menus and buttons explained. The subjects then used the application as they wished for 45 minutes. They were not permitted to use the clip reserved for this study.

10.2.3.2 Pre-watching task.

All subjects completed the pre-watching task which accompanied the video clip. This is shown below in Figure 10.4, and was to rearrange the words of five phrases into the correct sequence. It aimed to prepare learners for these phrases when they occurred in the input. The feedback appeared on-screen and all subjects could retrieve the correct version through a click on the Answer button.

Before you watch

Joe tells us about his job satisfaction at Ricoh. He uses the following phrases. Type the words in the correct order to make a phrase.

a) you your own job would evaluate How

b) worked years abroad 5 I for

c) safe to it's say think I

d) jump wasn't a me it for great

e) some the of the company and running in say

Answers

a) How would you evaluate your own job

b) I worked abroad for 5 years

c) I think it's safe to say

d) it wasn't a great jump for me

e) and some say in the running of the company

Figure 10.4 The pre-watching task.

10.2.3.3 Data Collection.

After the pre-watching task, subjects in the four classes were randomly divided into four treatment groups, each with different comprehension support resources available to them. These were:

- the video, tasks and subtitles group (VTS) which had all three of these supports available,
- the video and tasks group (VT) which had use of the video clip and the eight true / false tasks with feedback,
- the video and subtitles group (VS) which had the use of the video clip and the subtitles,
- the video only group (V) which only had access to the video clip.

The researcher checked that the subjects had configured their computers in this way.

Subjects were told their task was to write down as much of the information contained in the video clip as possible and that, in addition, they were required to do this re-using as much of the original language of the input as they were able. They were informed they were to use the application in whatever manner they preferred, according to the resource features which were available to each of the four different groups. They were told they had 6 minutes and 15 seconds to use the application, which was enough for 3 complete viewings of the video. No note taking was allowed while watching. Subjects used the application for the specified time and then exited the application. They were reminded of their task and then given 10 minutes to complete their writing. The writing was then collected. Examples of four subjects' written recall protocols from each of the four treatment groups are given in Appendix N.

10.2.4 Data analysis.

10.2.4.1 Recall Protocol.

This study used a target language recall protocol to measure comprehension. This procedure has been used extensively as a measure of comprehension by second language researchers e.g., Lund (1991), Garza (1991). This approach to the measurement of comprehension, as opposed to a multiple choice test, was selected so as to i) minimise the effect of guessing, ii) to measure the recall of any of the ideas in the text, not just those which would have been singled out for inclusion by any multiple-choice test, and iii) to enable an analysis of the language which had been used. The recall protocol has often been carried out using the subjects' L1, however this has the serious disadvantage of involving translation skills.

10.2.4.2 Measurement of recall of the language

The fifty-four pieces of writing were word-processed to form four mini-corpora, grouped as to the four input conditions, the VTS, VT, VS, and V groups. These were entered exactly as written, and so included all errors, spelling mistakes etc. This enabled the analysis for matches with the original input to be done by computer. The author using the concordancer Micro-Concord (1993) carried out the search for matches. As nothing would be gained by searching these mini-corpora for recurrence of individual words, the input text was divided into 42

"chunks" (LCs) of language, which consisted of phrases of three or four words long. Each of these LCs contained either a noun or a verb. An example of the first six LCs, derived from the beginning of the spoken text, is shown below in Figure 10.5.

Worked for a British company

Worked for Lucas

Worked abroad for 5 years

Came back to the UK in 1990

to work for Ricoh

Japanese company .

Figure 10.5 The first six LCs derived from the input text and used to match against subjects' writing.

These LCs were typed into Micro-concord and each of the four corpora searched for matches. A degree of flexibility was necessary in the search to allow for, for example, the changes in verb tenses or pronouns which would be necessary for subjects to reformulate the direct speech contained in the video into indirect speech. For example the spoken phrase "I think people have more involvement in a Japanese company" in the video which was rewritten "He thought that people had more involvement in a Japanese company" was counted as an acceptable match. The number of matches was then recorded. An example of the search results for the LC "*a great jump*" is shown below in Figure 10.6.

1 thinks people have more involvement in Japanese company It wasn't a great jump for him because n the british company they can't afford to allow

2. in the field of quality control working for Ricoh was not a great jump for him

3. quality control He comes from a zero defect department so it's a great jump for him He said he was fortunate and he talked about the Japanese

4. says that they were more involvement But it seems that it wasn't a great jump for him to change his work's policy In other words he estimated

5. He didn't find his change of firm Lucas Industries to Ricoh as a great jump. Lucas has the same zero defects policy but the Japanese are

6 their work, what he called job fullfillment. For him it wasn't a great jump to start working at Ricoh because he was abroad for five years

Figure 10.6 An example of the results of the search for the match for the LC "a great jump" in the corpus.

In addition to matches with the input text, the same procedure was also used to search for matches with: i) the five language phrases used in the pre-watching task (Figure 10.4), and ii) the language used in the eight true / false statements (Figure 10.3).

10.2.4.3 Measurement of the recall of the content.

The original text was divided into thirty-one propositions, or ideas, which were expressed in the text. This is to some degree subjective and the division was done originally by the author and checked with two colleagues. Differences were

discussed and the following thirty-one propositions, shown below in Figure 10.7, were agreed upon.

The topic /interview is about job satisfaction/fulfilment
Ricoh is concerned about job fulfilment / job satisfaction
He worked for a British company
He worked for Lucas
He worked at Lucas for a number of years
He started at Ricoh in 1990
He worked abroad for 5 years
He worked abroad
Ricoh is a Japanese company
He works at Ricoh
In the Japanese company you have more involvement
More involvement gets greater job satisfaction
Job satisfaction comes from having a say in the running of the company
All people in Ricoh are involved in daily quality control
Senior management are involved in daily quality control
Staff people are involved in daily quality control
Management's attitude to quality is discussed
His adjustment to management's attitude to quality
Involvement with daily quality control gives self fulfilment
He was fortunate
He worked at a place with zero defects (policy)
Brakes were involved in his last job.
There are differences in Ricoh
Ricoh wasn't a big jump for him
He had to make some changes
He had to adapt to Japanese ways
Japanese question why the defects
Japanese companies put defects right first time
There are differences in Japanese companies
These differences are not in British companies
Lucas was good preparation for him

Figure 10.7 The thirty-one propositions from the spoken text

Subjects' transcripts were matched against this checklist for correct recall of the propositions. This was done by five independent raters, who were not informed about the origin of the pieces of writing, nor about the treatment conditions of the subjects. To increase reliability all five raters attended a training session, led by the author, and several similar transcripts were matched and discussed. The five raters then worked alone and submitted their rating of the matches to the author. As the matching of ideas is necessarily subjective, the numbers of matches

for each subject, as recorded by each rater, were listed together and the highest and the lowest scores for each of the 54 subjects were eliminated. An average was then taken of the three remaining scores. The inter-rater reliability analysis calculated as a correlation coefficient is shown below in Figure 10.8. A score of more than 0.7 indicates a consistent degree of agreement and this occurs in 6 of the 11 correlations. Extracting the higher and lower scores of each rater compensated for the slight inconsistency of rater reliability.

	Rater 1	*Rater 2*	*Rater 3*	*Rater 4*	*Rater 5*
Rater 1	1				
Rater 2	0.595345	1			
Rater 3	0.596524	0.842842	1		
Rater 4	0.605581	0.714426	0.716194	1	
Rater 5	0.740249	0.709332	0.678417	0.79221	1

Figure 10.8 Correlation coefficients for the five raters across all the texts they rated

10.3 Results.

10.3.1 The four corpora.

Table 10.1 provides an overview of the four mini-corpora. All subjects wrote something. The average number of words written was 64.585. The group which had subtitles available (VS) wrote on average 10 more words than the video only (V) control group. The high standard deviations (*SD*) show that individuals varied greatly in the amount they wrote. There appeared to be a slight effect of the subtitles on the amount which was written. There is no real difference in the type / token ratios. The V group wrote the least of all the groups, they were the only group without any on-line written input.

TABLE 10.1 OVERVIEW OF SUBJECTS' WRITTEN RECALL TRANSCRIPTS ACCORDING TO THE MULTIMEDIA LEARNING SUPPORT RESOURCES AVAILABLE FOR USE WHILE WATCHING.

Groups according to the multimedia features available for use	***N***	**Total no. of words written in recall**	**Mean of words written**	***SD***	**Types**	**Type / Token ratio**	**Spelling errors**
Video only (V)	14	829	59.21	17.65	271	3.05	14
Video and subtitles (VS)	14	970	69.28	23.49	309	3.13	12
Video and tasks (VT)	13	844	64.92	20.53	262	3.22	14
Video, tasks and subtitles (VTS)	13	839	64.93	18.79	273	3.07	16

10.3.2 The recall of the language and the ideas contained in the pre-watching tasks

10.3.2.1 Recall of the language from the pre-watching task.

The pre-watching task was to reorder the words of five of the phrases from the video to make a correct phrase. These phrases would have been re-encountered

in spoken form while subjects watched the video. The matches between the language of the pre-watching tasks and the language LCs reused in the four corpora are shown below in Table 10.2. Subjects in the VS group would have encountered the phrases in three ways, two of which were written, namely in the pre-watching task and in the written subtitles, but in aural mode through the video sound track. This group reused the language in the pre-watching tasks most. The VTS group would also have had the opportunity to encounter the phrases in a similar fashion but reused the phrases much less. The second highest recall was by the V group, which had only had the opportunity to read any of the text in this pre-watching stage, being without the subtitles and the tasks in their treatment condition. It appears that when the opportunity to also use the on-line written tasks was added, then the tendency to reuse the pre-watching phrases was reduced. As might be expected, the effect of the meaning-focused tasks seems to be to reduce subjects' retention of the written language highlighted in the pre-watching phase.

TABLE 10.2. THE NUMBER OF EXACT LCS FROM THE PRE-WATCHING TASKS REUSED IN EACH OF THE FOUR CORPORA

	Numbers of the language LCs in the pre-watching tasks re-used in written transcripts		
Groups according to the multimedia features available for use	***N***	**Totals**	**Mean**
Video only (V)	14	9	0.64
Video and subtitles (VS)	14	15	0.92
Video and tasks (VT)	13	4	0.3
Video, tasks and subtitles (VTS)	13	4	0.3

10.3.2.2 The recall of the ideas in the pre-watching task.

The number of matches between the five ideas which were contained in the pre-watching phrases and the recall of these in the four corpora is shown below in Table 10.3. The video only group, who had only encountered the ideas in a written format once in the pre-watching stage, recalled most of these ideas. This seems to indicate that perhaps those ideas which were read, and then encountered

again only in a spoken format, were those that remained with subjects who had had no other access to written input.

TABLE 10.3. THE NUMBER OF IDEAS OF THE PRE-WATCHING TASKS RECALLED IN EACH OF THE FOUR CORPORA

	The quantity of ideas of the pre-watching tasks recalled in the four corpora		
Groups according to the multimedia features available for use	Max.	Total Matches	Mean
Video only (V)	5	14	1
Video and subtitles (VS)	5	12	0.857
Video and tasks (VT)	5	8	0.615
Video, tasks and subtitles (VTS)	5	7	0.538

10.3.3 The recall of the language and ideas contained in the eight true / false statements.

10.3.3.1 The recall of the language contained in the eight true / false statements.

Table 10.4 shows that the two groups who had had the opportunity to read the eight true / false statements, VT and VTS, re-used more of the LCs from the statements. There is a lack of such matches in the two groups who did not have access to these statements, as might be expected. On average at least one LC from the true / false statements was reproduced exactly by each subject in these two groups. That the exact language of these tasks has been consistently reproduced seems to assign an important role to the wording of real-time comprehension tasks, whether being used on paper or on computer screen. This language appeared to remain in subjects' short-term memory and be available for reuse. It also indicated that those with access to the tasks had probably used them to help focus and direct their understanding of the video.

TABLE 10.4. THE NUMBER OF LCS CONTAINED IN THE EIGHT TRUE / FALSE STATEMENTS REUSED IN EACH OF THE FOUR CORPORA.

	LCs in the eight true / false statements re-used in the written transcripts		
Groups according to the multimedia features available for use	*N*	Total	Mean
Video only (V)	14	7	0.5
Video and subtitles (VS)	14	3	0.214
Video and tasks (VT)	13	16	1.23
Video, tasks and subtitles (VTS)	13	27	2.076

10.3.3.2 The recall of the ideas contained in the eight true / false statements.

Table 10.5 shows the quantity of the ideas in the true / false statements found in each of the four corpora. The reproduction of these ideas was highest in the VT group who only had the tasks as extra learning support. The VTS group, the other treatment group with these tasks available, also reproduced more of these ideas than the V group. This again suggests that these groups had used the tasks

to help shape their understanding of the text and that the ideas remained with subjects in the short term. Provision of such on-line tasks seemed to foster understanding and recall of the ideas to which they were directing subjects. The anomaly here appears to be the VS group, who had no access to the tasks, but had reproduced more of the ideas than the VTS group. This might suggest that extra help in decoding the aural input through the written word was equally as effective as meaning-focused tasks in transferring these ideas.

10.5 THE NUMBER OF IDEAS CONTAINED IN THE EIGHT TRUE / FALSE STATEMENTS REUSED IN EACH OF THE FOUR CORPORA

Groups according to the multimedia features available for use	**Max.**	**Average Total Matches**
Video only (V)	8	1.72
Video and subtitles (VS)	8	2.12
Video and tasks (VT)	8	2.35
Video, tasks and subtitles (VTS)	8	2.06

10.3.4 The recall of the language and ideas contained in the spoken text

10.3.4.1 The recall of the language contained in the spoken text.

Table 10.6 shows the quantity of matches between the LCs in the videotext and those found in the four corpora. The mean scores are very low, each group averaging between 2 and 3.5 recalls of LCs. Two treatment conditions, VS and VTS, had the written version simultaneously available in the subtitles. Table 10.6 shows that the VS group reused more of the exact LCs of the input than the other groups. They had also written on average more. This suggests that the availability of the written word, juxtaposed with the video, facilitated the greater reuse of the exact LCs in the input. It is possible that the availability of the written word unlocked lexical items which were masked in the stream of speech for example Cutler (1997b). It suggests that perhaps subjects were reading and listening (perhaps not watching) simultaneously and that there is a possible differential effect of reading and listening on how language is processed and stored ready for reuse.

TABLE 10.6. THE NUMBER OF LCS CONTAINED IN THE VIDEO TEXT RECALLED IN EACH OF THE FOUR CORPORA.

	Language of the video text re-used in the written transcripts		
Groups according to the multimedia features available for use	*N*	Total Matches	Mean
Video (V)	14	31	2.02
Video and subtitles (VS)	14	49	3.5
Video and tasks (VT)	13	27	2.07
Video tasks and subtitles (VTS)	13	34	2.16

10.3.4.2 The recall of the ideas contained in the spoken text.

Table 10.7 below shows the quantity of the ideas in the input text reproduced by each treatment group. The figure for the average recall of ideas represented only a small proportion of those possible. The VS group recalled the greatest amount of the ideas from the original video text. This might suggest that, in a multimedia environment where subjects have available two different learning / comprehension support resources at the same time, it is not possible to maximise

the use of them both. If subjects were switching attention between the on-line tasks, the feedback and the subtitles, then the act of switching attention might have had a distracting effect. It is likely that the VS group used the subtitles continuously, needed less on-screen eye-switching and was able to focus and maximise their attention on the input. Previous work on subtitles suggests that visual decoding happens automatically and that this leaves subjects with a stronger imprint of the language forms. It also supports the findings of Lund (1991) which suggest that reading comprehension is more efficient than listening.

TABLE 10.7. THE NUMBER OF IDEAS CONTAINED IN THE VIDEOTEXT RECALLED IN EACH OF THE FOUR CORPORA (NON-ADJUSTED NUMBERS ARE THOSE BEFORE SUBTRACTING THE TOP AND BOTTOM SCORES).

	Ideas in the video text recalled in the written transcripts		
Groups according to the multimedia features available for use	**Max.**	**Average total Matches non-adjusted**	**Average total matches adjusted**
Video (V)	32	4.41	4.40
Video and subtitles (VS)	32	5.02	5.02
Video and tasks (VT)	32	4.67	4.51
Video tasks and subtitles (VTS)	32	4.75	4.73

10.4 Limitations of the study.

The limitations of this study are as follows. Firstly, the use of L2 written recalls is only one way in which to try to measure comprehension. Other methods, for example a multiple choice test, may have yielded different results. No account has been taken of the importance of the different ideas to the main meanings conveyed in the text. In addition, the results may have been affected by the use of the productive writing skill, and had the recalls been spoken rather than written, they may have produced different results. A higher recall of ideas might also have been achieved had the written recalls been done in L1. In all cases the number of recalls of LCs and ideas was very low. Subjects' writing may have been affected by factors other than the particular learning support resources to which they had access, such as interest in the task, tiredness etc. The study uses only one section of one specific multimedia program and no account was taken of what subjects actually did by recording their mouse clicks and interactions while using the software. The subjects were of a specific type, i.e., academic, presumably motivated and also computer literate. The study is a "snapshot" and a longitudinal study, measuring effects over a longer time span, would be preferred.

10.5 Summary.

The results give some support for the first hypothesis, which was that the effect on comprehension of the learning support resources would be to increase comprehension. The three groups, which had tasks and subtitles available to them, recalled more ideas and re-used more of the language of the video text than the video only group. Provision of comprehension support resources does, in fact, result in greater comprehension.

With regard to the second hypothesis, it also appears that the effects of the availability of various types of learning support resources are different and can be isolated. There are different effects upon what is recalled and how it is recalled according to the type or combinations of resource made available. The availability of subtitles had the most impact. Differential effects could also be seen according to modality of input. When input in a written form was available, supplied via subtitles and or the written true/false statements, it was more likely to be reproduced.

10.6 Implications.

10.6.1 Multimedia is effective in enhancing comprehension.

The results go some way towards showing that multimedia environments, which can provide support to comprehension, facilitate a more effective understanding

of spoken texts. They also facilitate greater re-use of the original language. Thus, supplementing language input with additional resources, which guide and focus understanding, is effective. All three groups which had the support features available re-used more of the language of the video clip, and were able to re-cycle more of the ideas than the group with the unsupported video clip. It also appears that subjects are able to use such support resources to judiciously enhance their own understanding, and to exploit them when they were required to fill in gaps in understanding.

It might be thought that asking subjects to listen, as well as to read true / false statements, click on a mouse and then notice the feedback, might distract and interfere with listening comprehension, but the evidence was to some extent to the contrary. No evidence was found to suggest that working with the multi in this multimedia environment had any detrimental effects on levels of comprehension. Multimedia can be configured to provide learners with a system which provides quick and on-line opportunities for increasing levels of understanding, according to individual need. It enables the provision of a more sophisticated and learner-centred environment, especially if compared to a teacher-led classroom listening comprehension task, involving an audiocassette played in conjunction with pen and paper tasks. The data here shows that the multimedia provision in this configuration does translate into demonstrable increases in comprehension and language re-use.

10.6.2 The different effects of the different learning support resources.

Interestingly, the data shows that there are different effects for the different types of support resource and that those effects can be traced. For example, the groups who had access to the tasks and feedback had retained the language used by the task statements and recalled more of the ideas in the tasks. The effect of the written subtitles in increasing recall of ideas and language is also apparent and will be discussed in more detail below.

These effects might be explained by looking at the processing channels which each of the learning resources engaged. Video uses the visual channel for the moving image and the acoustic for the sound. Subtitles use the visual channel, as do the tasks and feedback. Processing of information and language is thought to be easier and more successful when the two different channels are used in harmony, rather than when two or more media use the one channel, as would be the case if text and pictures or animation (without sound) and text were presented. The VTS group did not fare as well as the VS group, suggesting that the tasks and subtitles, which both used the visual channel, could not both be processed efficiently. Tasks and subtitles, both written, may have caused cognitive overload (Sweller, 1994).

10.6.3 The different effects on comprehension of reading and listening.

There is a different and noticeable effect of the use of the reading and listening skill. The group with only unsupported video to exploit, and therefore only using listening comprehension, fared least well on the recall of ideas and re-use of language. The highest recall of both was by the video plus written subtitles group. This group was able to use both listening and reading comprehension. A further reading effect is to be seen through the amount of the language of the pre-watching and while-watching tasks which was reused. In previous studies, the reading skill has been found to be consistently more efficient for comprehension and recall of ideas e.g. Lund (1991) than the listening skill. Work on the effect of subtitles, e.g., Garza, (1991), Danan, (1992) has shown that subtitled-video promotes more recall of ideas and language than video alone. Therefore, while provision of subtitles does increase comprehension of listening texts, it probably does so by engaging the more highly developed comprehension skill of reading. There are four differences though between real-life reading and the use of subtitles in this multimedia application:

- the subtitles were always accompanied by the sound,
- there was no access to the whole text, which limited skimming and scanning to the two or three lines of the subtitles on the screen,
- spoken texts are rarely written down verbatim to be read as texts,
- subjects could only read as fast, or slow, as the computer presented the subtitles.

Although no account was taken of how subjects exploited the subtitles, there are four strategies that could have been adopted. These were:

- reading and ignoring the sound,
- ignoring the subtitles altogether and just watching and listening,
- focusing on both the spoken and written word simultaneously,
- or a combination of these where they dipped into and out of the subtitles when the stream of speech proved indecipherable.

The effectiveness of the subtitles in facilitating comprehension and language recall signals a pedagogic dilemma. In real-life listening there is no access to subtitles, so if we are trying to develop listening comprehension it may not be of long-term benefit to make subtitles available. However, if language acquisition occurs through comprehensible input and subtitles do increase understanding then their provision is justifiable.

10.6.4 Multimedia software design.

The different recall effects have implications for the design of language learning multimedia software. Indeed, it might be recommended that studies such as this, aimed at quantifying the differential effects of the use of the different features in the multimedia environment, should be an intrinsic part of any language learning software design process. There seems to be evidence that if the desired language

learning outcomes of particular listening comprehension activities are form-focused, and intended for acquisition of vocabulary, collocations or grammar then encouraging or providing the use of subtitles might be useful. If the objective is the development of listening comprehension and increasing understanding of a spoken text, then supplementing the language input with meaning-focused tasks to allow the instant monitoring of comprehension (O'Malley et al., 1989), would be useful. However, although considerations such as these may lead to more effective software design, it needs to be remembered that the ability to provide a range of easily accessible learner-controlled choices is special to multimedia technology, and that perhaps the real decisions about which of the learning resources to exploit are best made by each individual learner according to their own needs.

10.6.5 Multimedia and independent language learning.

The data indicated that multimedia should provide a useful and effective independent study tool with which to empower our learners, especially if it is considered alongside the results of the study described in Chapter 7, which showed that the dimensions of choice, flexibility and control over learning are highly valued by learners. Multimedia facilities may give added value to self-access centres, and prove a better investment for learners than do language laboratories

10.6.6 Multimedia and language acquisition.

The data indicate that the use of multimedia as a language learning tool is likely to be more effective than unsupported video for language acquisition. If the comprehension-based models of SLA prove to be accurate, and that it is input which is made comprehensible by learners which leads to language acquisition, then multimedia will provide an effective environment for language acquisition. Multimedia can deliver language as raw input and supplement the input with a variety of tools or resources which learners can use, on an individual needs basis, to enhance their comprehension and negotiate their understanding. The learning support features replicate the processes of negotiation of understanding. They can assist in: confirming and checking understanding, clarifying speech, assisting learners in noticing gaps in their performance and in their language knowledge. Learners can exploit the supporting features available in multimedia to make the necessary modifications upon raw input to make it comprehensible. These results confirm Doughty's (1991a) description of the place of multimedia in SLA theory as being tenable within the negotiated interaction model of language learning. Further research into the strategies employed by learners, whilst using these different supporting features to negotiate their understanding, is necessary before this can be confirmed.

11. An Analysis Of Incidental Language Learning Through Use Of The Multimedia Applications.

This chapter describes a study which looks for evidence of language learning achieved through the use of the applications. It builds on the previous research findings by investigating the incidental learning of language chunks contained in the multimedia input. It extends the scope of previous studies e.g., Brown, 1993, Liu and Reed, 1995 by using applications designed to develop listening comprehension. In addition, this study analyses incidental learning over a period of time. It describes the relationship between language chunks which were reused in subjects' writing with those found in the original input. In particular, it investigates the reuse of those chunks, which in order to encourage 'noticing' and 'negotiation', were configured to be salient in the multimedia environment. The application made some of the language salient in three ways:

- by making language items the focus of interactive form-focused tasks
- by presenting language items as underlined and in a different colour in the subtitles with a hypertext link to an explanation or definition
- through illustration by moving visual image

The relationship was investigated as evidence for incidental language learning of implicit knowledge. Implicit L2 knowledge is that which comprises the learner's current interlanguage system. Ellis (1997) describes it as

> ... intuitive, in the sense that the learner is unlikely to be aware of having ever learnt it and is probably unaware of its existence. .... Implicit knowledge only becomes manifest in actual performance and, in this sense, is procedural. (1997, p. 111)

In the instructed L2 setting it is thought to result from meaning-based instruction (Ellis, 1990).

11.1 Hypotheses.

The two hypotheses were:

1. There will be an observable and positive relationship between the language that has been made salient within the multimedia environment and that reused by subjects.

2. There will be an observable and positive relationship between the input language of the multimedia environment, but not made salient, and the language reused by subjects.

11.2 Methods.

11.2.1 Subjects.

The subjects were 64 NNS undergraduate learners of business English, studying a final year module in the School of Languages and European Studies, at the University of Wolverhampton. They were the same group as described in the study in Chapter 8.

11.2.2 Materials.

11.2.2.1 Formal test paper.

As a mandatory strand of an undergraduate module in business English, subjects were required to use the two CD-ROMs in order to acquire information about two companies. This was described in Chapter 8. They needed to be familiar with the companies' business, key business concepts, and the professional roles of the business people featured in the material. Students' understanding was measured through an unseen, written paper. This analysis is based on a corpus compiled from subjects' written answers to the three questions in Figure 11.1 below.

1. Write a brief outline (150 - 200 words) of both of the **two** companies - a) Banks' and b) Ricoh - you could mention things like:-

i) their business;

ii) their background, history, organisation and location;

iii) any figures which are useful;

iv) their main areas of activity;

v) their particular strengths;

vi) any unique features about the companies.

2. Choose one of the people below (a-d) and give a brief outline of their roles and responsibilities (50 words). Total marks 10 - all for content.

a) Fran Hayes - Banks' b) Joe Fenney - Ricoh c) Roger Hargreaves - Ricoh d) Rob Jackson - Ricoh.

3. Write a brief explanation of **one** of the following concepts (50 words). Total marks 10 - all for content.

a) The Haizan Production system;

b) The role of the Marketing Department;

c) Quality circles;

d) Branding

Figure 11.1 The three exam questions answered by subjects. Subjects' answers were used to build the corpus for this analysis

Question 1 parts (a) and (b) were compulsory for all subjects, but for questions 2 and 3 subjects had a choice. It should be noted that subjects were not asked to reuse any of the language from the input in their answers and so any reuse of language chunks would have been in the context of expressing meaning.

11.2.3 Procedure.

11.2.3.1 Rationale for this assignment.

This assignment was included in the curriculum for four reasons. Firstly, although learners were studying in an L1 environment their access to authentic Business English was limited. Secondly, it was felt that self-study time of six hours per week could be used more effectively and that this should be formalised and prescribed. Thirdly, it was supposed that the use of the CD-ROMs for acquisition of content information may result in incidental language development, as it provided 'comprehensible input' and opportunities for 'negotiated input'. Such incidental learning has been shown to occur in content-based ESL reading instruction e.g., Kasper (1995). It was also supposed that use of multimedia would contribute to the development of subjects' listening comprehension. Fourth, as learners' reactions and attitudes to the use of multimedia had already been observed as extremely positive it was thought compulsory use would also be welcomed.

11.2.3.2 Use of the multimedia applications and this analysis.

This was described in Chapter 8, section 5.1, but to briefly reiterate: subjects were introduced to the applications in class time, shown how to access and use them, and directed towards their main learning features and resources. During this session they were also briefed on the nature of the assignment and the evaluation criteria. Subjects had three months of out-of-class time in which to study with the CD-ROMs.

The research was not conducted in an experimental setting and the procedures described below were not set in place for the purpose of collecting this data, nor for the purpose of this analysis. The exam took place as a required self-study component of an undergraduate module in Business English and the analysis took place in retrospect. This was to replicate learning conditions which occur during autonomous learning.

11.2.3.3 The corpus of subjects' writing.

The written answers to each of the three questions were typed into a word processor to comprise ten separate text files, one of each of the ten different questions. This made ten mini corpora of subjects' responses to each question. Each subject's answer was typed exactly as written, preserving spelling errors, capitalisation etc.

11.2.3.4 Language chunks as the unit of analysis.

The aim was to compare the language chunks (LCs) found in subjects' written work with those provided and available as input within the multimedia applications. The LCs were selected from the language input available in the applications in a way which aimed to try to control (as far as is possible) the effect of LCs which might have been learnt from other contexts or which may already have been a part of the subjects' language repertoire. This would enable a more precise insight into the relationship between the multimedia language to which subjects were exposed, and that which they reused. The LCs were made up of collocations or phrases all containing nouns or verbs. Only those LCs that would have been relevant to the completion of the writing tasks were selected. It was assumed if subjects reused such LCs then it was at least likely that this reuse was affected by, or came as a result of, their interaction with the multimedia applications. Such a research method is suggested by Chapelle (1998, p. 29) who says researchers should examine "... is there evidence that learners attended to salient linguistic characteristics of the target language input? Evidence might consist of .... observation of subsequent use of items."

These LCs were extracted from the sections of the CD-ROMs which related to the three exam questions, as shown in Table 11.1 below.

TABLE 11.1 THE EXAM QUESTIONS WITH THE SCENE AND CLIP FROM THE MULTIMEDIA APPLICATION WHERE THE INFORMATION RELEVANT TO COMPLETION OF THE QUESTION WAS PROVIDED AND THE TYPES OF SALIENCE FOR LANGUAGE CHUNKS

Exam Question	**Multimedia scene containing the information necessary to complete the question**	**Hotspots available?**	**Language focused-tasks available**	**Video image illustrating concepts in the audio track?**
1. Write a brief outline (150 – 200 words) of both of the <u>two</u> companies - a) Banks' and b) Ricoh - you could mention things like:- i) their business; ii) their background, history, organisation and location; iii) any figures which are useful; iv) their main areas of activity; v) their particular strengths; vi) any unique features about the companies.				
a) Banks'	The Managing Director - Whole Scene'	Yes	Yes	No
b) Ricoh	About Ricoh UK.	No	Yes	Yes
2. Choose one of the people below (a-d) and give a brief outline of their roles and responsibilities.				
a) Fran Hayes - Banks'	Marketing the product - Marketing at Banks'	Yes	Yes	No
b) Joe Fenney - Ricoh	Issues in managing quality - Quality control	No	Yes	No
c) Roger Hargreaves - Ricoh	'I'm responsible for ...' A Director of Ricoh	No	Yes	No
d) Rob Jackson - Ricoh.	'I'm responsible for ...' - Quality Assurance Manager	No	Yes	No
3. Write a brief explanation of <u>one</u> of the following concepts (50 words).				
a) The Haizan Production system;	The manufacturing processes - The Haizan system	No	Yes	No
b) The role of the Marketing Department	Marketing the product - Marketing at Banks'	Yes	Yes	No
c) Quality circles	Issues in Managing quality - Quality throughout the company	No	Yes	No
d) Branding	Marketing the product - Future initiatives	Yes	Yes	No

The LCs were extracted from the three resources in the multimedia applications, where applicable, and Table 11.2, below shows those LCs extracted from each of the three in the multimedia scene 'The Managing Director - Whole Scene'. The three resources were

- the video / subtitles input,
- the tasks,
- the words in the subtitles which had hotspotted definitions.

TABLE 11.2. THE THREE SETS OF LCS EXTRACTED FROM THE MULTIMEDIA CLIP 'THE MANAGING DIRECTOR - WHOLE SCENE'

LCs in the video and subtitles Only	**LCs made salient through hotspots**	**LCs made salient through the on-line tasks**
2 or 3 percent	a small fish in a	a vertically integrated company
35 million barrels	a vertically integrated company	rights issue
4 - 5 percent	acquisition	consumer patterns
44 million barrels	ale	overall declines
6 or 7 percent	barrel	self -invested funds
a lot of opportunity	branding	sound logistics
a result of	cask	profitability
a very small local brewery company	demand base	financial resources
a very substantial income	demographics	product advantages
a wider range of	diversify	substantial income
Attract	entirely by	
Been based on this site	gaming machine	
Big pond	incorporation	
Borrowings	issued shares	
Consumer attention	logistics	
Steadily eroded	market share	
Continue*	net margin	
Convert into	on-trade	
Distribution area	organic	
Dynamic	rights issue	
Fewer people	self-invested funds	
Funded our (their) development	soft drinks	
Good local knowledge	was founded	
Greater net margins.		
Has declined to		
Has remained very high		
Have/has access to		
Higher value items		
Highly profitable		
is characterised		
National brewer*		
one of the oldest public companies		
out of profits		
over a hundred years ago		
Overall		
Potential for growth		
steel industry,		
the beer business		
the beer drinking population		
the heavy industries		
the largest regional		
the underlying demand base		
tight distribution		
tight lines of communication		
total distribution		
Unusual in that		

The first area of comparison was with the LCs contained in the core video and delivered by sound and subtitles. This was possible for each of the ten questions. Column 1, of Table 11.2 above, shows the *LCs extracted and used for* comparison from 'The Managing Director - Whole Scene'.

The second set of LCs which were sought in the corpora comprised those LCs found in the on-screen tasks, which accompanied the video input. In each of the two applications there were a variety of task types which accompanied the video. These either focused upon the meanings in the input text or on the language form of the input text. For example, True / False comprehension questions or putting ideas in the order they were heard, were aimed at supporting comprehension. However, the LCs which were selected from the tasks for comparison were those which focused subjects' attention on phrases or vocabulary found in the input. Column 3 of Table 11.2 above shows the LCs extracted from the tasks accompanying 'The Managing Director - Whole Scene'. As explained in 11.4.3.4 above, not all LCs were selected for comparison, only those regarded as unique to the application and relevant to the task were selected. As described in Chapter 5, the applications used a three-stage task sequence, Before, While and After-watching. Where one of these stages used tasks which focused on LCs, then these were selected for comparison, e.g., Figure 11.2 shows a LC focused-task which is in the After-watching slot.

After you have watched

Match the words on the left with those on the right to make business phrases from the video.

Put the letter after the phrase on the right.

a) oldest	i) based on this site
b) started	ii) public companies
c) always been	iii) over a hundred years ago
d) rights	iv) issue
e) overall declines	v) patterns
f) product	vi) market share
g) substantial	vii) integrated company
h) vertically	viii) advantages
i) national	ix) income
j) changing consumer	x) in volumes
j) sound	xi) logistics
k) higher levels of	xii) profitability

Figure 11.2 The language-focused task which accompanied the clip 'The Managing Director - Whole Scene' as an after-watching task and from which the LCs were derived.

The third set of LCs extracted from the multimedia application were those words and phrases which were hotspotted in the subtitles. Column 2 of Table 11.2 above shows the LCs extracted from the hotspots in 'The Managing Director - Whole Scene'. An example of the hotspots in the multimedia application appears below in Figure 11.3 These were differentiated from the rest of the subtitles by underlining and colour, and a click on them accessed a definition or further

explanation. Possible obscure lexis, phrases and business terminology had been selected for hotspotting, such as *'a big fish in a small pond'*. In certain cases there was also an overlap between these hotspots and the language items which were the focus of language tasks. In some cases this created three multimodal ways of making these LCs salient, through input, hotspots and tasks, as can be seen in the case of 'vertically integrated company', in Table 11.2 above.

Demographics (noun)

Demographics are factors which relate to communities and the changes in communities

Figure 11.3 The hotspot definition of demographics from 'The Managing Director - Whole Scene'

A final mechanism of salience which needed to be considered was that created by instances where the moving video images simultaneously illustrated the ideas being spoken about. This type of salience occurred in only one of the video clips 'About Ricoh UK', where, for example, the sound-track talks about another factory being *'under construction'* and a variety of workmen engaged in construction are shown in the video image.

11.2.3.5 Analysis of the corpora.

Each of the ten mini corpora were examined for occurrences of the LCs. This was done through the use of the concordancer software Micro-concord (1993).

Each LC from the three sets was typed into the software and the number of matches recorded. A certain degree of flexibility was allowed as subjects reusing any of the LCs may have had cause in their writing to change word endings. Where this was done it is indicated by a * wildcard in all tables. An example of the results of the search for the LC *'demographic*'* is shown below in Figure 11.4. These are the 13 occurrences which were found in the corpus derived from the written answers to Question 1 (a).

1 The decline in the market is due to demographics and the change in consumer behaviour.
2 beer then 10 years ago. Indeed, the demographic changes involded that now people drink
3 you can see a lot of changes in reason of demographic changes and changes in the behaviour
4 in particular because of the demographic emphasis, - the beer market is a broad market
5 consumption of beer are changing, mainly due to demographic factors (age, work, drinking at
6 willing to pay more money : the reason is demographics. Finally, they have its own method
7 the volume of beer declines because of demographics issues : there is less are less workers in
8 now takes 35 million. This is due to demographics - less people work in the steel industry but
9 its managers, the company must be face to a demographic problem. Indeed, nowadays, less
10The consumation is declines. (demographic reason), the firm thought about 3 new develo
11 price. David Thompson thinks the reason is demographic.
12 decline of beer sales because of the demographics. The people's life changings they're fewer
13 pattern, it's really just to do with demographics. The general trend is towards drinking

Figure 11.4 The thirteen matches with the LC 'demographic' found in the corpus derived from answers to Question 1 (a)*

11.3 Results.

11.3.1 An overview of the corpora.

Table 11.3 below provides an overview of the composition of the ten mini-corpora according to the question answered. All 63 students completed the two compulsory parts to Question 1, but not all attempted Questions 2 and 3. None chose to answer Question 3 (d) and only two answered Question 2 (b). These two questions were thus excluded from any further analysis, leaving eight corpora for further analysis. The average number of words used to answer the questions was generally greater than requested. The two largest corpora result from the answers to Questions 1 (a) and 1 (b) each comprising more than 8,000 words. This overview shows that the assignment was attempted satisfactorily by all subjects. It shows that they had studied with the applications, extracted the information, used appropriate strategies to remember it, and were able to write in sufficient depth on the topics.

TABLE 11.3 A QUANTITATIVE OVERVIEW OF THE COMPOSITION OF THE TEN MINI CORPORA.

1. Question Number	2. Number of subjects' answers in corpus	3. Total no. of words written	4. No. of words asked for	5. Average no. of words written	6. Type / token ratio
1. (a) Ricoh	63	8753	150 - 200	138.9	6.34
1. (b) Bank's	63	8334	150 - 200	132.3	6.89
2. (a) Fran Hayes	18	956	50	53.1	2.88
2. (b) Joe Fenney	2	137	50	68.5	1.8
2. (c) Roger Hargreaves	18	1094	50	60.7	3.86
2. (d) Rob Jackson	17	955	50	56.17	3.31
3. (a) Haizan	15	1100	50	73.3	3.17
3. (b) Marketing	25	1911	50	76.4	3.57
3. (c) Quality circles	20	1374	50	68.7	3.47
3. (d) Branding	0	0	50	0	0

11.3.2 Non-salient LCs in the corpora.

The first part of the analysis describes the matches between LCs which were in the input, but not made salient by the multimedia environment. Columns 2, 3, and 4, in Table 11.4 below, show the quantity of LCs provided by the subtitled-video as input, the average reuse of LCs per subject, and the number of LCs reused by more than 10% of subjects. To provide more detail, the LCs derived from Questions 1(a) and (b) and searched for in the two largest corpora, are shown below in Table 11.5.

TABLE 11.4 *THE QUANTITY OF NON-SALIENT LCS FROM THE INPUT FOUND IN EACH OF THE CORPORA*

1. Question Number.	**2. No. of LCs in video / subtitle input but not made salient**	**3. Average reuse of those LCs not made salient per subject**	**4. LCs reused by more than 10% of subjects**
1. (a) Ricoh	32	3.18	3
1. (b) Banks	45	3.82	6
2. (a) Fran Hayes	47	1.38	0
2. (b) Joe Fenney		-	-
2. (c) Roger Hargreaves	34	1.73	1
2. (d) Rob Jackson	68	0.98	9
3. (a) Haizan	37	2.56	3
3. (b) Marketing	41	3.62	3
3. (c) Quality circles	42	1.73	9
3. (d) Branding	-	-	

TABLE 11.5 THE NON-SALIENT LCS DERIVED FROM THE INPUT IN TWO SECTIONS OF THE APPLICATIONS AND THE AMOUNT AND PERCENT OF REUSE OF EACH LC IN THE CORPORA DERIVED FROM QUESTIONS 1 (A) AND 1 (B)

LCs relevant to Question 1 A - Banks'			**LCs relevant to Question 1 B - Ricoh**		
LCs in the video and subtitles only	**No. of reuses**	**% who used LC**	**LCs in the video and subtitles only**	**No. of reuses**	**% who used LC**
2 or 3 percent	29	46.03	based in Tokyo, Japan.	13	20.63
6 or 7 percent	25	39.68	is part of a multinational	9	14.29
4 - 5 percent	18	28.57	office automation equipment	9	14.29
the largest regional	12	19.05	manufacturing plants	6	9.52
one of the oldest public companies	9	14.29	a wide range of products	6	9.52
total distribution	7	11.11	won	6	9.52
out of profits	6	9.52	a 50 acre green-field site	5	7.94
44 million barrels	5	7.94	adherence to	5	7.94
over a hundred years ago	5	7.94	for the removal of	5	7.94
a very small local brewery company	5	7.94	The location was chosen	4	6.35
tight lines of communication	5	7.94	quality assurance	4	6.35
Distribution area	4	6.35	cfcs	4	6.35
tight distribution	4	6.35	only manufacturing site	3	4.76
Borrowings	4	6.35	the ease of access to	3	4.76
35 million barrels	3	4.76	some 40 years ago	2	3.17
the heavy industries	3	4.76	is situated on	2	3.17

TABLE 11.5 (CONT) THE NON-SALIENT LCs DERIVED FROM THE INPUT IN TWO SECTIONS OF THE APPLICATIONS AND THE AMOUNT AND PERCENT OF REUSE OF EACH LC IN THE CORPORA DERIVED FROM QUESTIONS 1 (A) AND 1 (B)

National brewer*	3	4.76	The company philosophy	2	3.17
Good local knowledge	3	4.76	is based on	2	3.17
big pond	1	1.59	building quality products	2	3.17
Funded our (their) development	2	3.17	Environmental issues	2	3.17
steel industry	2	3.17	in the early 1980s	1	1.59
have/has access to	2	3.17	construction was completed	1	1.59
Potential for growth	2	3.17	guaranteeing total customer satisfaction	1	1.59
Greater net margins.	2	3.17	stated purpose	1	1.59
been based on this site	1	1.59	at the interface of	1	1.59
is characterised	1	1.59	strict	1	1.59
the beer business	1	1.59	gained	1	1.59
Fewer people	1	1.59	of great concern	1	1.59
Steadily eroded	1	1.59	*including watches,*	*0*	*0*
the underlying demand base	1	1.59	in Telford, a new town in Shropshire,	0	0
a wider range of	1	1.59	to constantly create	0	0
Higher value items	1	1.59	new value for the world	0	0

TABLE 11.5 (CONT) THE NON-SALIENT LCS DERIVED FROM THE INPUT IN TWO SECTIONS OF THE APPLICATIONS AND THE AMOUNT AND PERCENT OF REUSE OF EACH LC IN THE CORPORA DERIVED FROM QUESTIONS 1 (A) AND 1 (B)

Dynamic	1	1.59
Attract	1	1.59
the beer drinking population	1	1.59
Convert into	1	1.59
Unusual in that	0	0
a lot of opportunity	0	0
has declined to	0	0
a result of	0	0
Highly profitable	0	0
a very substantial income	0	0
has remained very high	0	0
Continue*	0	0
Consumer attention	0	0

The amount of reuse of LCs not made salient is very small. In corpus 1 (a) only six LCs were reused by more than 10% of subjects e.g., *'2 or 3 percent'*, *'6 or 7 percent'*, *'total distribution'* and *'the largest regional'*. Similarly in corpus 1 (b) only one LC was reused by more than 10% of the subjects, *'based in Tokyo, Japan'*. This tendency is also found in the smaller corpora (Table 11.5) where two corpora, 2 (d) and 3 (c), had 9 reuses of LCs each by more than 10% of subjects. The data shows that LCs from the input which might be regarded as both essential to the task, and possibly also known to subjects from sources outside of multimedia, e.g., *'hi-tech company'* and *'environmental issues'* in 'Ricoh', were minimally reused, three and two times respectively. Similarly in 'Banks', among the LCs not reused at all were some which would probably have been known already by subjects e.g., *'a result of'*, *'declined to'* and *'retailing concepts'*. Overall there was a relatively minor incidence of reuse of the LCs in the video input but not made salient. The direct relationship between the LCs in video / subtitles input and those recalled and reused when subjects wrote about the particular topic is weak.

11.3.3 LCs made salient through tasks.

This part of the analysis examined the corpora for reuse of the LCs which were made salient in the multimedia applications through being the focus of on-screen tasks. Tasks which focused on some of the LCs which were present in the video input were included to facilitate 'noticing' (Robinson, 1995) of the LCs and possible acquisition. The LCs originally selected for inclusion as the focus of

tasks were those presumed to be difficult, new, or of particular interest to business English students. The LCs which were the focus of interactive tasks in the section of the applications relevant to Question 1 (a) and (b), together with the number and percentage of reoccurrence in each corpus are shown below in Table 11.6. The LCs included in interactive tasks related to the remainder of the corpora are similarly shown in Table 11.7 following.

TABLE 11.6 LCS MADE SALIENT BY BEING THE TARGET OF LANGUAGE-ORIENTED TASKS IN THE SECTIONS 'HISTORY OF BANKS' AND 'ABOUT RICOH UK' TOGETHER WITH THE QUANTITY OF REUSES FOUND IN THE CORPORA

LCs made salient by being the focus of language-oriented tasks in 'The Managing Director - whole scene' and the number of reuses in corpus 1 (a)			**LCs made salient by being the focus of language-oriented tasks in 'About Ricoh UK' and the number of reuses in corpus 1 (b)**		
LCs made salient through the on-line tasks	**No. of subjects who reused LC**	**% of subjects who used LC**	**LCs made salient through the on-line tasks**	**No. of subjects who reused LC**	**% of subjects who used LC**
a vertically integrated company	7	11.11	plant(s)	38	60.32
rights issue	6	11.11	quality circles	16	25.40
consumer patterns	5	7.94	transport networks	14	22.22
overall declines	4	6.35	zero defects	14	22.22
self -invested funds	4	6.35	proximity to	11	17.46
sound logistics	3	4.76	a pool of skills	11	17.46
profitability	3	4.76	small logical steps	9	14.29
financial resources	1	1.59	methodical approach	8	12.70
product advantages	0	0	green-field site	7	11.11
substantial income	0	0	links with	7	11.11
			adherence to	7	11.11
			under construction	5	7.94
			the removal of	5	7.94
			interface	1	1.59

A different tendency emerged when the corpora were searched for matches with these task-salient LCs. There was a much stronger tendency for these LCs, which took the form of words but mostly of phrases, to be reused in all 8 of the corpora. In 'About Ricoh UK' all of the fourteen task-embedded LCs were reused. Twelve were reused by more than 10% of subjects. For example, the phrases *'zero defects'* and *'transport networks'* were reused by fourteen subjects, while *'a pool of skills'* by eleven. There was also a high incidence of reuse of the nine task-salient LCs in the 'Banks' corpus, and again all were reused at least once. For example, the LCs *'vertically integrated company'* and *'rights issue'* were reused by seven learners, and *'self-invested funds'* by four. Although this amount of matches is small, such LCs might be considered linguistic items which were sophisticated and unlikely to have been part of the learners' interlanguage before contact with the application. It should, though, also be noted that the two most frequently found items, *'rights issue'* and *'vertically integrated'*, were also in the hotspots.

TABLE 11.7 LCS MADE SALIENT BY TASKS IN THE MULTIMEDIA APPLICATIONS ACCORDING TO THE SIX TOPICS AND THE NUMBER AND PERCENTAGE OF REUSES FOUND IN EACH CORPUS.

2 (a) LCs made salient in *'Fran Hayes'*	**No. of subjects (*n*=18) who reused LC**	**% of subjects who reused LC**	**2 (c) LCs made salient in *"Roger Hargreaves"***	**No. of subjects (n=17) who reused LC**	**% of subjects who reused LC**	**2 (d) LCs made salient in *'Rob Jackson'***	**No. of subjects (n=17) who reused the LC**	**% of subjects who reused LC**
Packaging	9	50.00	director	17	100	quality management system	8	47.04
Promotion*	8	44.44	manufacturing	15	88.24	after sales service	6	35.28
Market trends	8	44.44	company secretary	10	58.82	quality management system	5	29.4
Product development*	4	22.22	consumables	9	52.94	Long-term reliability analysis	3	17.64
Television	0	0	personnel	8	47.06	in-line responsibility	2	11.76
Advertising campaign	0	0	drums	7	41.18	Around the table	2	11.76
			toner	2	11.76	day to day basis	2	11.76
			photocopiers	1	5.88	broken down into	0	0
						batches of product	0	0
3 (a) LCs made Salient in *'Haizan System'*	***(n = 15)***		**3 (b) LCs made salient in *'Marketing'***	***(n= 25)***		**3 (c) LCs Made salient in *'Quality Circles'***	***(n=20)***	
Concentration	8	53.34	packaging	9	36	discuss*	10	50
a large box	7	46.67	promotion*	7	28	co-ordinate*	4	20
Mixed production	5	33.33	market trends	6	24	Encourages	4	20
Foolproof	2	13.33				Active participation	2	10
Wrong components	2	13.33				Quality improvement	2	10
were running a	2	13.33				come up with	1	5
Quality problems	0	0				Suggestions for improvement	1	5
Consists of	0	0				come up with	1	5
						at each level	0	0

The analysis of the six smaller corpora (Table 11.7) also showed subjects' tendency to reuse these task-salient LCs. In 'Rob Jackson' seven out of the nine were reused, including *'quality management system'* by eight of seventeen subjects, *'after-sales service'* by six and *'long-term reliability analysis'* by three. Again these can be considered sophisticated phrases. It is interesting to compare the nature of the task-salient and reused LCs with other LCs which occurred only as input in the video. There appears to be no reason why, arguably, more common constructions from the Ricoh video such as *'is situated on'* should appear only twice, *'in the early 1980s'* and *'a new town'* only once, whereas *'zero defects'* was reused by fourteen subjects, *'a pool of skills'* and *'proximity to'* by eleven, and *'links with'* by seven. All of these last four LCs having been made task-salient. Similarly, more complex yet task-salient LCs from 'The Managing Director - whole scene' were reused more frequently than some more straightforward LCs. This may indicate an incidental learning effect resulting from the salience given to these LCs through their inclusion in interactive tasks within the multimedia environment.

11.3.4 LCs made salient as hotspots.

The words and phrases chosen from the subtitles to be hotspots were underlined and appeared in a different colour. The words in the subtitles not hotspotted were black. The hotspots were hyperlinked to dictionary type definitions and were accessed by a mouse click which also brought the video to a halt. They were only available in the Banks' CD-ROM and so analysis of the reuse of hotspots

was restricted to Questions 1 (a), 2 (a), and 3(b). The results are shown in Table 11.8 below.

TABLE 11.8 THE LCS APPEARING AS HOTSPOTS IN THE 'INTRODUCTION TO A COMPANY' APPLICATION AND THE NUMBER OF REUSES FOUND IN EACH CORPUS

LCs made salient through The hotspots in *'The managing Director - whole scene''*	**No. of reuses of LC**	**% of subjects who used LC**	**LCs made salient through the hotspots in *'Marketing the product - whole scene'***	**No. of reuses of LC**	**% of subjects who used LC**	**LCs made salient through the hotspots in *'Marketing the product - whole scene'***	**No. of Reuses Of LC**	**% of subjects who used LC**
Market share	47	74.60	implement*	24	7	in-tune	2	11.11
was founded	34	53.97	in-tune	1	1	advertising campaign	1	5.56
Issue* shares	16	25.40	advertising campaign	4	1	implement*	1	5.56
Demographic*	13	20.63	to hold one's head high	0	0	product initiative*	1	5.56
Ale	13	20.63	product initiative	0	0	cross-section	1	5.56
Gaming machine*	10	15.87	cross-section	0	0	to hold one's head high	0	0.00
Organic	9	14.29						
Barrel	9	14.29						
soft drinks	9	14.29						
Acquisition	8	12.70						
a vertically integrated company	7	11.11						
Rights issue	7	11.11						
Cask	7	11.11						
Incorporation	6	9.52						
Diversify	6	9.52						
Entirely by	4	6.35						
self –invested funds	4	6.35						
logistics	3	4.76						
on-trade	2	3.17						
Branding	2	3.17						
a small fish in a	1	1.59						
demand base	1	1.59						
net margin	1	1.59						

The analysis showed that these hotspotted LCs, like the task-salient LCs, were reused more prolifically than LCs appearing as input only. In 1(a) all twenty-three of the hotspotted LCs were reused. For example, *'market share'* was reused by 75% of subjects, *'demographics'* by 20%, *'issued shares'* and *'organic'* by 14%, and *'gaming machines'* by 15%. In the smaller sample from 3 (a) *'implement'* was reused by seven subjects. Such LCs might be considered as new linguistic items for subjects and it is unlikely that subjects would have encountered, or possessed a working knowledge of most of them, but for their work in this application. This suggests that there has been an incidental learning effect, brought about by learners accessing and consulting, these LCs which had been provided with extra definitions through a hotspot. It also confirms the salience effect achieved through multimedia as proposed by SLA theorists such as Chapelle (1997, 1998) and Doughty (1991a).

11.3.5 LCs made salient through video images.

In only one of the sections of video from one of the CD-ROMs (Ricoh) was some of the information described in the sound track also depicted in the video. For example; *'Japanese manager'* was accompanied by footage of the company's Japanese Managing Director, *'under construction'* by workmen in hard hats alongside a half-completed building, and *'Telford'* by a motor way sign including this name. LCs which can be depicted in visual form are of course limited to those of a concrete nature. As shown below in Table 11.9 there was a high tendency to reuse the LCs illustrated in the video e.g., *'Telford'* by all writers,

'Japanese manager' by 50 writers and *'under construction'*, which is probably less directly illustrated by visual image, by 5 writers. Although the LCs illustrated by a video image were few, and such video embroidered salience provided only in this section of this CD-ROM, there was a substantial amount of reuse these items. This confirms findings in other studies of the juxtaposition of LC and image e.g., Chun and Plass (1996).

TABLE 11.9 THE LCS MADE SALIENT THROUGH DEPICTION AS A MOVING VIDEO IMAGE IN THE SCENE 'ABOUT RICOH UK'.

LCs made salient through the video image in 'About Ricoh UK'	**No. of subjects who reused each LC**	**% of subjects who reused each LC**
Telford	63	100
Japanese manager	50	79.36
pool of skills	11	17.46
Transport networks	14	22.22
Quality products	9	14.28
Cfcs	6	9.52
Under construction	5	7.93

11.4 Limitations of the study.

There are several limitations of this sub-study. It dealt with data collected in a naturalistic learning setting and it may be that an experimental approach would

have yielded more concrete results. For example, a controlled pre-test, post-test and further test methodology may have produced data upon which more definite conclusions could have been reached. However, in the author's opinion, perhaps naturalistic studies such as this are more appropriate for the examination of implicit language learning. The reuse of LCs from the input, or of those made salient, does not necessarily mean that this reuse has been caused by subjects' interaction with the application. It is possible that subjects may already have acquired these LCs. No account was taken of how long individual learners used the application, nor were individual records kept of what tasks or hotspots were consulted, nor of the strategies learners had used while working with the CDs and then subsequently preparing themselves for the written exam. Such information on the interactional processes would facilitate stronger claims. The overall sample is not large and is of a specific learner type.

11.5 Implications.

11.5.1 Use of multimedia and incidental language learning.

In this study subjects used the applications for meaning-focused listening comprehension, and subsequently recycled the information they had gained to complete a further meaning-based written task. Hypothesis 1 proposed that a by-product of comprehension-focused study would be a high and observable amount of incidental language learning. The evidence from the matches of language in

this study do not show strong evidence that incidental learning, as defined by recall and reuse of the LCs, had occurred. This contradicts findings of incidental learning in similar studies e.g., Chun and Plass (1996) who found high incidental learning of vocabulary via multimedia-based reading tasks. Incidental learning, though, has been measured here through those linguistic items which had been reused, and it might, of course, be that a quantity of new language was learnt, but did not reappear in this meaning-focused task. One explanation for this might be that learners were at an Advanced level and already had sufficiently broad language knowledge to be able to reformulate their ideas without resorting to the original language of the input.

11.5.2 Multimedia and the effect of salience.

Within the framework of SLA theory, one of the strong claims made for the advantages of multimedia-based language learning environments is that they facilitate learning through their ability to make linguistic items salient (Brown, 1993; Chapelle, 1997 and 1998). This claim is supported by these results with a greater proportion of salient LCs reused than non-salient LCs. They also corroborate the previous findings as to the positive effects for language learning attributable to salience in the multimedia environment , for example,

- Brown (1993) for learning of vocabulary items made salient in tasks, by glosses, or by a meaningful position in the story line,
- Liu and Reed (1995) for learning of vocabulary made salient by hypertext links to further definitions, examples, pictures, exercises etc.,
- Chun and Plass (1996) for vocabulary made salient through combinations of text and pictures.

The results extend these findings to show that LCs made salient and encountered in a multimedia-delivered listening comprehension environment also appear to have been noticed. Both annotating such salient items with definitions and making them the conscious focus of interactive tasks made reuse more likely. Therefore, multimedia's unique ability to afford saliency to designated linguistic items, through hypertext or interactive tasks, can be seen as being pedagogically effective.

11.5.3 Salience in the multimedia applications and the processes of 'noticing' and negotiation.

The LCs which were salient were reused most consistently. Such salience may have assisted as a first step in noticing these LCs, but to gain further linguistic information or to access and confirm meanings would have needed further conscious action by subjects. It would have required subjects to realise they needed, or wanted, extra information and then to use the application to seek this information. Subjects would then need to read further explanatory definitions or

to have activated their linguistic knowledge to complete tasks, taking note of success or failure. These learner-controlled actions might be thought of as a form of 'negotiation', leading on from 'noticing' salient LCs. It appears this process had an effect on subjects' ability to reuse these LCs. Perhaps, then, it was the two stage action of, firstly, noticing the salient LCs, and then following this with a decision to find out more, by accessing definitions or completing tasks, which had facilitated such greater reuse. This process may be akin to what Ellis (1997) calls: "Interactional modification during the negotiation of meaning (for example attempts to deal with communication problems) may result in the learner noticing particular features in the input that might otherwise be ignored." (1997, p.120)

12. Conclusions.

The goal of this thesis was to explore the application of multimedia to L2 language learning. This was pursued by:

- reviewing the literature on the conditions thought to facilitate SLA and describing the match between these and the technological potential of multimedia,
- designing applications in the light of these conditions, plus those which influence L2 listening comprehension, and those relevant from research findings of the beneficial effects of CALL,
- carrying out research into some of the effects of the use of these applications.

This chapter draws these elements together to provide a general overview of the findings (the specific implications drawn from each investigation were outlined at the end of Chapters 7, 8, 9, 10 and 11), the implications for multimedia-delivered language learning, and suggestions on fruitful areas for further research.

12.1 SLA theory provides usable guidelines for designing multimedia software.

The approach adopted in this thesis was that the design of the application needed to be based on, and guided by, SLA theory which is the discipline most closely related to its learning outcomes. The SLA literature indicates some of the conditions which are likely to facilitate L2 language learning. These current understandings of the conditions which facilitate language learning and the pedagogic approaches aimed to foster such conditions were fundamental to the configuration of the applications. The instructional design of the L2 multimedia applications proved that it was possible to replicate some of these conditions in the human computer environment. Additionally, the evaluation processes undertaken here tentatively indicated that this language learning environment facilitated learning gains. Although our understanding of the processes of SLA and of the most effective pedagogic approaches to facilitate the development of SLA are nowhere near complete, there are existing hypotheses and practices which are able to provide guidelines as to the most beneficial ways of configuring multimedia to promote language learning.

However, the provision of multimedia language learning environments is necessarily going to be interdisciplinary. The development of these applications needed the professional expertise of film makers, computer programmers, and graphic designers. These experts brought their own discipline specific theoretical

knowledge to their tasks on this project and thus contributed theory from different fields. These knowledge fields were harnessed to support the implementation and to realise multimedia applications which were designed and based upon principles of SLA. Levy (1997, p. 221) argues that CALL applications should be derived from a synthesis of four different theoretical areas, namely theories of instructional design, language teaching, language learning and human-computer interaction. This thesis though has tentatively demonstrated that SLA theory might provide the overarching theoretical basis for the configuration of multimedia language learning environments and that the theoretical ideas from other disciplines, such as human computer interaction, should support elements of the learning environments but not as such guide the enterprise.

Future research into the processes of SLA will further refine this understanding of how best to facilitate second language learning. In turn this knowledge might be used to underpin the design of SLA multimedia applications. Likewise, further understandings in the disciplines needed to create CALL, or more specifically multimedia language learning materials, should feed into and therefore enhance such learning environments. Ultimately it might be possible to envisage CALL as having its very own theoretical base, rather than deriving its principles from SLA theory.

12.2 Multimedia-delivered L2 input is beneficial for SLA.

While input can, of course, be delivered by other means, multimedia is able to simultaneously deliver input using different combinations of media. Media can be chosen to use the two different language processing channels simultaneously, for example pictures and sound, or to use the same processing channel, for example pictures and text. When media which use the different processing channels to convey the same information are selected the information is more easily processed. (Mayer, 1997) as there is redundancy in the input. Video and subtitles were used here, and found to be beneficial, although many combinations are technically possible, for example sound, animation and text, sound and pictures, text and pictures etc. On the other hand, if combinations of media that are simultaneously using the same processing channel are used to convey information, for example animation (with no sound) and text, then this redundancy effect is lost. In this study, for example, the juxtaposition of written tasks and subtitles, both using the visual channel, did not produce greater comprehension than the video and subtitles using two channels, although it did produce greater comprehension than video alone. The beneficial effects on comprehension of input delivered in a dual processing channel format of video and sound and subtitles have been demonstrated by previous research (Garza, 1991; Danan, 1992; Borras and Lafayette, 1994) and were replicated in this research.

The implications for the production of L2 multimedia courseware are that consideration needs to be given as to which media, or combinations of media, are going to be used to convey information. This needs to be done taking into account pedagogic objectives, together with the potential effects of the use of the different processing channels and of the different language skills of reading and listening. Among the different types of information which L2 software developers may need to convey at specific places in applications are the on-screen instructions to learning tasks, material for these tasks, input for the tasks, feedback on learner performance, language learning advice strategies (Chapelle, 1993), glossaries and explanations of linguistic forms. For example, dictionary type information, where the objective maybe recognition or production of a particular word, plus an understanding of its meaning, may benefit from the inclusion of a sound file so that meaning and pronunciation are illustrated. Another example of a creative use of different media and different processing channels might be to use an animated demonstration plus a spoken description, to accompany a formal explanation of the word order of the noun phrase. Likewise, any on-screen instructions to learning tasks, where the objective is sufficient understanding for learners to be able to complete the tasks, might be delivered by both sound and text, and perhaps include L1 sound for very low proficiency levels.

Further research might try to uncover the optimal combinations of media for the input of multimedia courseware, relating these closely to proficiency levels, and the instructional purpose of the material. Research might investigate what are the best combinations of media for instructions, grammatical explanations, written

and aural form focused-tasks, the different types of feedback, word definitions, and for language learning strategy advice.

12.3 Multimedia can provide an environment through which L2 input can be made comprehensible through learner instigated negotiation.

SLA theory posits that it is input which is comprehensible that is of most benefit and that the interactional processes which serve to make L2 input comprehensible may also promote SLA. The delivery of language input simultaneously through different media, which use the different processing channels, is one way in which comprehension can be advanced. In addition, input delivered through a multimedia environment can be juxtaposed with resources which enable learners to negotiate their comprehension. Negotiation of meaning refers to the discourse processes found in NS / NSS interactions whereby participants mutually co-operate to clarify each other's speech. Interactional moves such as confirming meaning, asking for repetition, clarifying or requesting clarification were found to contribute to comprehension, for example Long (1996). This research showed that the inclusion of such resources which contribute to comprehension at the semantic, syntactical and lexical levels of understanding does result in the negotiation of meaning. Interactive comprehension tasks were juxtaposed with spoken input and their use resulted in greater comprehension than the same tasks without instant feedback. Tasks were provided to consolidate or to highlight syntactical and lexical features of the input, and hyperlinks from the subtitles allowed access to definitions and explanations of syntax and lexis. Linguistic

features treated in this way were spontaneously reused in naturalistic settings more frequently than those which did not have such comprehension supports allotted to them.

Implications are that multimedia can be, and should be, configured so as to include the resources to facilitate and encourage users to negotiate their comprehension of input. L2 multimedia applications can and should juxtapose any input with suitable resources which can be used to retrieve the semantic or syntactic information from the input. Therefore, the design of applications needs to consider how best to provide opportunities for interactional moves, such as learner-instigated clarifications, comprehension checking, or repetitions. The selection of the linguistic items which were accompanied by definitions was guided by the author's intuition and by the centrality of the items to the field of business English. As a design feature it may have been of greater utility to learners to have provided a hyperlinked glossary from the subtitles, which gave definitions and explanations to all of the language items in the input, rather than restricting the items. Written definitions were provided for nominated items in the input and accessed via the subtitles. Given the greater impact of using combinations of media, perhaps the definitions could have used visual material, pictures and diagrams where appropriate.

Further investigations need to consider how best to emulate the process of negotiation of meaning in multimedia, including how best to indicate on the computer screen that there are the resources which can help with non-comprehension. They also need to consider how best to present the information which is to be used to resolve non-comprehension, considering the multiple

media options available. Indeed, a mechanism which guided or encouraged learners to use a variety of their own strategies to resolve their miscomprehension, whilst still ultimately allowing access to, say, word definitions, may be more beneficial. This might be achieved through strategy advice such as, 'Is the word important?', 'Does it look like a word in your own language?' or 'Can you guess the meaning?'. Another fruitful area of research would be to try to ascertain if there is a connection between the frequency of use of the comprehension resources and subsequent recall of, or reuse of, items, perhaps through the use of a computer log. Technological advances in speech recognition software which will eventually enable spoken dialogue with computers should also provide fertile means for replicating face-to-face negotiation of meaning

12.4 Multimedia instructional design needs to promote opportunities for 'noticing' input.

'Noticing' of input has been found by quantitative experimental work, for example Doughty (1991b) and qualitative work, for example Schmidt and Frota's (1986) diary studies, to result in new L2 linguistic forms coming to learners' attention, being understood and subsequently being used. Pedagogic tasks can be configured, on and off the computer, to make 'noticing' more likely, for example Robinson (1995). The multimedia environment provides L2 materials writers with a variety of ways for making linguistic items salient so as to encourage 'noticing'. This application used tasks to highlight lexis and syntax, and

hyperlinked hotspots containing definitions from words and phrases in the subtitles, made noticeable by colour and underlining. The connection between the potential of the multimedia environment and this aspect of SLA theory is close, and the research reported here confirmed the connection between salience in the multimedia environment and subsequent language reuse.

The implications are that the design of L2 instructional interfaces should harness the potential of multimedia for encouraging noticing, according to the specific language learning aims of the courseware. The means used here, colour and underlining for visual salience, were effective. An application, though, may be configured so as to allow learners to select, say from the subtitles to a video, which items they require to be made salient. Thus in a video clip of a business presentation designed to sell a new product the learner might ask for all the phrases which signal that a new point is going to be made, or all the phrases which illustrate advantages. These would then be extracted from the input or picked out with colour.

Further research needs to consider the impact of the different methods of making language salient in the multimedia interface. This overlaps with research into human-computer interface design. Plass (1998) proposes a more rigorous approach to the user interface for SLA multimedia applications than adopted here, and argues that there needs to be direct connections between cognitive processes and the features of the L2 human-computer interface. The use of on-line self-reports of which items had been noticed, and why, would help inform the configuration of salience. Likewise, experimental studies linking salient items to

subsequent recall should further understanding of how best to promote 'noticing'.

12.5 Multimedia as a medium does not provide long-term motivation.

It was hypothesised that multimedia would motivate learners according to Crookes and Schmidt's (1991) three levels of micro, classroom and syllabus. At the micro level, use of multimedia may increase attention to input and assist in the development of useful language learning strategies. Subjects' self-reports indicated that there was a link at this level and that they believed the application to be an effective L2 learning environment. Additionally, there was greater comprehension of input when learners were able to use metacognitive strategies, such as "monitoring", facilitated through the provision of feedback, to evaluate their comprehension. The flexibility and adaptability of the application to individuals' different strategies was confirmed through post-use self-reports of the strategies which had been used.

As a classroom activity, learners' attitudes were more positive to the use of the application than to other technologies such as the language laboratory, and this confirmed the findings of previous studies (Watts, 1989). This was revealed in subjects' self-reports when the application was used as a one off lesson, but such positive attitudes did not translate into spontaneous use. Likewise, as language learning material it was highly valued when used as a one-off lesson. However,

when the motivation to use the application was extrinsic, attitudes were not as positive. The application did not have the ability to motivate learners to the extent that they would use it to study when not mandatorily required to, or at least it did not compete well against other calls on learners' time. It can be concluded that the applications motivate at the level of attention, will be motivating when used as one in a series of lessons, but that there is no inherent long-term motivational effect associated with the technology as such. This finding concurs with Englesberg (1998).

The implications are that there is no lasting motivational effect of the technology, and that when the use of multimedia becomes more ubiquitous even the initial novelty effect will have diminished. It appears that motivation will be enhanced when multimedia applications are proven to deliver effective L2 learning. Motivation will be enhanced through observable learning outcomes, rather than through the use of the technology itself.

12.6 Multimedia can provide autonomous language learning opportunities.

The rationale for encouraging autonomy in L2 learners is that this accommodates individuals' circumstances, may result in higher proficiency levels and can increase awareness of how to learn foreign languages, which in turn also promotes higher attainment. As demonstrated here for L2 listening

comprehension, multimedia can be configured to provide a completely autonomous learning tool. Multimedia allows all the pedagogic apparatus, namely the instructions, input material, tasks and feedback to be in one environment.

However, whilst an autonomous application was configured and provided, it was not voluntarily exploited. The reasons for this probably lie outside of the merits or otherwise of this application. Among these may be that students' time is limited, they were studying subjects as well as their modules in business English, the marks gained in final year undergraduate study count towards one's final degree classification, and they were not short of access to spoken English as they studied other subjects through the medium of English. Other explanations may be connected to the procedures for accessing the software or attitudes to computers. Further research might compare the take-up of opportunities to study through multimedia when subjects were studying outside the country of the L2 and therefore had limited access to L2.

12.7 How should multimedia be integrated into the language learning curriculum?

The lack of autonomous and intrinsically motivated use of the applications found in this research, raises the question of how it is best to integrate multimedia into

an L2 curriculum. Two ways of incorporating the application into the curriculum were trialled; its use as one in a series of lessons, and its compulsory use for completion of an assignment. The former was highly appreciated by learners, but none chose to use it by themselves. The latter was highly rated initially, but attitudes had changed following the assignment.

Further research might investigate other ways of integrating multimedia into the L2 curriculum. These might include the use of different and specified sections of the software each week or using the software only during teacher supervised sessions, perhaps every three or four weeks. Comparative research might be undertaken to confirm learners' preferences for types of self-study, for example videos, books, or multimedia. In addition, research might investigate which aspects of the development of L2 language competency are best tackled through the autonomous use of multimedia.

12.8 Multimedia can be configured to provide opportunities for practice of listening comprehension.

Multimedia would seem to be an ideal tool for L2 listening comprehension work. It can be configured to replicate the pedagogic approach to listening comprehension advocated by Underwood (1989), Rost (1990). The application described here included pre-listening work to build expectations of the content, the provision of tasks which focus and support extraction of the meanings from

speech, and follow-up tasks to exploit and reinforce language experienced in the input. It appeared that such a provision in multimedia format had inherent advantages to classroom-based listening comprehension work. It facilitated greater comprehension than video or audiotape input used in conjunction with paper-based tasks. This resulted from having input and tasks in one place, ease of response through the use of the mouse, and access to instant feedback on task success. These allowed learners to monitor their comprehension and to reconsider meanings when wrong. In addition, learners having access to various supports during their listening achieved better comprehension than those using the video input alone.

Further research might investigate the implementation of different multimedia-based approaches to the development of L2 listening comprehension. In the literature recently, for example Field (1997) there have been calls for the systematic development of the skills and sub skills of L2 listening, rather than merely providing a forum for practice. An approach to L2 listening development based around systematic skills development could equally be delivered via multimedia. Research into multimedia-based development of L2 listening proficiency might quantify gains over time, through pre- and post-use skills tests.

12.9 Feedback on real-time comprehension of L2 speech increases comprehension.

Feedback to help learners notice their errors is hypothesised to develop L2 proficiency. Research into feedback in the context of CALL generally indicates a positive effect. This study revealed the positive effects of real-time feedback on comprehension of L2 speech. Provision of feedback to listening tasks in classroom work is usually provided by teachers when listening has stopped. Multimedia-delivery, though, can deliver instantaneous feedback which seemed to enable on-going interpretations of the message to be monitored, and if erroneous, interpreted correctly. In the light of this, it would be recommended that applications focused on L2 speech comprehension should use instant feedback.

Further research might investigate the effects of different types of feedback. The feedback in this application was right / wrong type feedback. This was the only type which suited real-time listening tasks. However, different types of feedback might have been more useful for those tasks which did not need to be completed while simultaneously watching the video. Feedback to these tasks, for example the before watching, after watching tasks and language work tasks) might have been configured differently. Feedback in these circumstances could have provided explanations as to why answers were as they were. It could have provided hints so that learners could rethink and correct themselves along the lines suggested by Robinson (1992). Indeed, a further level of feedback to the

while-watching tasks, but available after the video had finished, could also have explained why answers were what they were. This would have provided opportunities for learners to explore errors when real-time tasks had been completed. Such feedback could have been provided through an automatic link between a task component and the video and subtitle section which contained the language and / or information which pertained to the task.

12.10 The scope of the application of multimedia to SLA will be widened with technological advances

The processes of the design, development, production and evaluation of the multimedia applications described in this thesis were begun almost simultaneously with the advent of affordable PC-based multimedia technology. However, since the start of this project there have been various computer-based technological advances which will further impact upon multimedia-delivered language learning. The expansion of the World Wide Web both in terms of its entry into the consciousness of the public and of its sophistication will probably result in this being the main form of delivery for multimedia materials. For example, the increases in the sophistication of audio and video 'streaming' software, for example *Realplayer* (1998) and of higher speed 56K modems mean that real-time video and audio files are playable from the WWW. Although at the time of writing the WWW does not deliver interactive multimedia to the standard of CD-

ROM, this is not far away. Also at the time of writing digital TV channels, and therefore potentially interactive TV, were about to be launched in the UK. This may provide yet another means of delivering interactive multimedia.

Advances in speech recognition software, and to a lesser extent speech production software, have been swift. In tandem CALL practitioners have been quick to seize the opportunities afforded by the at present rudimentary technology and have begun to apply and evaluate it in the field of language learning (e.g., Melissa Holland ed., 1999). Although two-way spoken interaction with computers is not yet possible, it is no doubt on its way, and if exploited so as to emulate the processes of the negotiation of comprehension should be a useful addition and one which can be easily integrated into multimedia applications. Another really significant advance in the application of computer-based technology to SLA might be envisaged with the development of virtual reality.

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Appendix A. An overview of the major studies into the effects of computer-delivered feedback on language learning.

An overview of the major studies into the effects of computer-delivered feedback on language learning.

Researcher	Learners	Effect of feedback investigated	Language area	Results
Bationo (1992)	US undergraduates of French	Differential effects of four different types of feedback: i) no feedback ii) written feedback iii) spoken feedback iv) written and spoken feedback	Future indicative of regular verbs	Significant effect for the written and spoken feedback options for recall of the material No effect for a later "retention" test
van der Linden (1993)	Dutch learners of French	Learning effect of feedback Attitudes to and strategies with types of feedback	Grammar	No clear results of learning effect Learner preference for an "optimal" learning strategy feedback of
Nagata (1993)	US learners of Japanese	Intelligent feedback with explanations as to why answers were wrong versus Traditional feedback - indicating missing or erroneous words	Vocabulary Particles Nominal modifiers Verbal predicate	Significant learning effect for group with intelligent feedback
Brandl (1995)	US learners of German	Four feedback types: i) right or wrong ii) error location iii) grammatical description of correct response iv) the correct answer	Grammar High and low level learners Task difficulty	All subjects preferred right/wrong type feedback Significantly positive attitudes to program allowing the exploration of errors

Appendix B. An overview of the major studies into the effects of Interactive Video Discs on language learning.

An overview of the major studies into the effects of Interactive Video Discs on language learning.

Researcher	Learners	Effects investigated	Language learning area	Results
Scrupp et al. (1983)	Beginners German	Analogue video versus non-linear IVD	Content	IVD group better achievement and retention of the content
Crotty (1984)	Beginners French		Grammar Vocabulary	IVD group learned more grammar and vocabulary
Brandvold et al. (1986)		IVD group versus non-IVD group	Vocabulary Expression Content Learner Attitudes	Both groups had increased learning in all 3 areas IVD significantly better expression IVD laboratory rated more highly that CAI or audio/visual labs
Verano (1987)	Beginners Spanish	Three versions of an IVD: fully interactive, half interactive and linear	Achievement and retention Attitudes to non-classroom instruction	Fully interactive version group had better achievement and retention of language Computer instruction group said they missed the classroom
Gale (1989)	Beginners Spanish	Effects of three IVDs versus linear instruction with the same materials	Achievement Attitudes	IVD, non-linear format for materials most effective Favourable learner attitudes
Marks (1989)	Beginners Spanish	Effects of video context	Listening comprehension	Video in IVD facilitated greater comprehension
Watts (1989)	Beginners French	Effects of IVD IVD versus video and worksheets	Translation Comprehension of short sentences Attitudes	IVD scored better Pronunciation gains Favourable attitudes in IVD group

Appendix C. An overview of the major studies into the effects of multimedia on language learning.

An overview of the major studies into the effects of multimedia applications on language learning.				
Researcher	Learners	Effects investigated	Language Areas	Results
Meskill (1991)		Effects of on-line learning strategy advice - one group with / one without	Oral performance on functions of "disapproving" and "apologising" Attitudes to materials	No significant difference between the two groups' oral performance or in attitudes to the materials Advice messages were used by the group which had them Recommended multimedia systems had advice messages available to ensure maximum effective exploitation
Meskill (1993)		NNS versus NS creating on-line story using cartoons and audio files	Spoken discourse of NS and NNS engaged in the same task	Multimedia used as a problem-solving tasks might not be useful in promoting natural discourse
Brown (1993)	ESL immersion programs	Effects of a video-based multimedia disc used non-mandatory self-study mode Effects of words made salient through glosses or exercises	Vocabulary according to: the overall frequency of the words; the specific context frequency; instructional focus saliency; gap in context saliency.	Learning effects for overall frequency of words No effects for frequency of words in videodisc An effect for words which were salient to the story of the videodisc No effect for words made salient in the program via glosses or exercises
Borrás and Lafayette (1994)	French undergraduates	Effect of video-based multimedia with subtitles versus no subtitles	Spoken functions of describing and narrating Attitudes to materials	Significant effects of subtitles on oral performance Highly positive attitude to materials - more so for subtitles group
Liu and Reed (1995)	All levels	Effect of multimedia on vocabulary learning using vocabulary hypertextually linked to 5 learning options of: definitions, part of speech, sentence examples, pictures, exercises	Vocabulary learning learning styles attitudes / anxiety proficiency level	Positive effect of vocabulary learning and retention - at all levels - no affect according to learning styles - positive attitudes linked to good vocabulary scores - reduced computer anxiety

Appendix C (cont.) An overview of the major studies into the effects of multimedia on language learning.

An overview of the major studies into the effects of multimedia applications on language learning (cont).

Researcher	Learners	Effects investigated	Language Areas	Results
Johnstone and Milne (1995)	French 11-12 year old children	Whole class use of a teacher-controlled multimedia disc, over a year	Communicative discourse and interaction in the classroom	Increase in communicative discourse by pupils and by teacher.
Chun and Plass (1996)	German undergraduate level	Effects of multimedia annotations of vocabulary i) text annotations ii) picture and text iii) video and text	Vocabulary acquired incidentally through reading Effects of the 3 annotation types Look up behaviour	High rate of incidental vocabulary learning Vocabulary with the picture + text annotation most learnt Correlations between use of annotations and vocabulary learning

Appendix D. An overview of the major studies into the effects of multimedia on listening comprehension.

An overview of the major studies into the effects of multimedia on listening comprehension				
Researcher	Learners	Effects investigated	Language areas	Results
Dunkel (1991)	EFL TOEFL	Computer as used for learner adaptive placement test	Listening - placement tests Attitudes	Positive learner attitudes
Grezel and Sciarone (1994)	Dutch as a second language	Effect of daily testing of computer-delivered listening comprehension - one group typing in of oral sentences compared to a non-computer group	Effect of computer monitoring on progress during course	Positive effects for experimental group on end of course general language proficiency test
Greifnieder (1995)	EFL school children	Effect of vocabulary presented as: text plus visual versus text plus audio	Vocabulary learning	No effects for vocabulary learning in group which had audio support

Appendix E The "Introduction to a Company" CD-ROM.

Appendix F The "Managing Quality" CD-ROM

Appendix G. The self-report questionnaire used to measure learners' attitudes to the multimedia application in Chapter 7.

1. How do you feel about listening to English?

confident	1	2	3	4	5	not confident
relaxed	1	2	3	4	5	nervous
good at it	1	2	3	4	5	bad at it

2. Do you study English alone (please circle)

a lot often sometimes occasionally never

3. Do you practice listening alone? (please circle)

a lot often sometimes occasionally never

4. Studying with this CD-ROM
(Please tick one box)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
is simple					
is relevant to my needs					
gives me useful feedback					
is useful					
gives me flexibility					
is easy					
is motivating					
allows me to work at my own speed					
is fun					
would encourage me to study alone more					
is not flexible					
is boring					
would improve my English					
doesn't give me feedback					
gives me complete control over my learning					
will improve my listening comprehension					
is complicated					
will help me learn new language e.g. vocabulary					
is difficult					
is not relevant to me					
is a waste of time					
doesn't allow me to work at my own speed					
won't improve my vocabulary					

Appendix G (cont). The self-report questionnaire used to measure learners' attitudes to the multimedia application in Chapter 7.

doesn't help me practice my listening					
is not enjoyable					
gives me no control over my learning					
won't make my English better					
is not motivating					
is interesting					
would not encourage me to work alone more					

5. 3 things I disliked about using the CD were

i)
ii)
iii)

3 things I liked about using the CD were

i)
ii)
iii)

6. What is this CD-ROM most similar to .... (please put in order 1 = most ... 5 = least)

a teacher a reference book a tool a book a game

Appendix H. The pre-assignment questionnaire used in Chapter 8.

1. I think that using these CD-ROMs as an integrated part of my course will (please tick):-

Please tick a box:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
be motivating					
allow me to work at my own speed					
be useful					
be a waste of time					
be an interesting assignment					
be complicated					
be difficult					
be fun					
be interesting					
be more useful than listening classes with a teacher					
be relevant to me					
didn't do well at this assignment					
encourage me to study alone more					
give me no control over my learning					
give me useful feedback					
make me have problems with this assignment					
improve my English					
improve my listening comprehension					
not be flexible					
improve my knowledge of English e.g.:- vocabulary					

2. Three things I think I will like about studying with the CDs as part of my course were:-

1.
2.
3.

3. Three things I think I won't like about studying with the CDs as part of my course were:-

1.
2.
3.

Appendix I. The post-assignment questionnaire used in Chapter 8.

1. How often did you use the CD-ROMs from the time you were introduced to them? (please tick one box)

Daily	
Weekly	
Fortnightly	
Every three weeks	
Monthly	
Only when the assignment was near	

2. When you used the CDs how long on average did you study with them? (please tick)

10 mins	20 mins	30 mins	40 mins	50 mins	1 hour	70 mins	80 mins	90 mins	100 mins	110 mins	120 mins

3. I thought that using these CD-ROMs as an integrated part of my Business English course was (please tick):-

Please tick a box:-	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
was motivating					
allowed me to work at my own speed					
was useful					
was a waste of time					
was an interesting assignment					
was complicated					
was difficult					
was fun					
was interesting					
was more useful than listening classes with a teacher					
was relevant to me					
didn't do well at this assignment					
encouraged me to study alone more					
gave me no control over my learning					
gave me useful feedback					
had problems with this assignment					
improved my English					
improved my listening comprehension					
was not flexible					
improved my knowledge of English e.g.:- vocabulary					

4. Three things I liked about studying with the CDs as part of my course were:-
   1.
   2.
   3.

Appendix I (cont.). The post-assignment questionnaire used in Chapter 8.

5. Three things I didn't like about studying with the CDs as part of my course were:-
   1.
   2.
   3.

6. When you were working with the CD-ROMs how did you use them?

Briefly and in note form could you describe what you did when you used them:- e.g. -
I just watched the video / I wrote down all the transcript / I did all the exercises

-
-
-

Many thanks,

Paul Brett

Appendix J. The formal written test used in Chapter 8.

BALB 3 - Assignment 5 - Two company case studies

Name:- _____

Group:- _____

Time allowed = 1 hour 30 minutes. Write all your answers on this question paper. No dictionaries allowed.

1. Write a brief outline (150 - 200 words) of both of the **two** companies - Banks' and Ricoh featured in the CDs - you could mention things like:-

i) their business
ii) their background, history, organisation and location
iii) any figures which are useful
iv) their main areas of activity
v) their particular strengths
vi) any unique features about the companies

Total marks = 20 for each company (15 content - 5 for written accuracy)

2. Choose one of the people below and give a brief outline of their roles and responsibilities (50 words). Total marks 10 - all for content.

i) Roger Hargreaves - Ricoh or ii) Chris Nichol - Ricoh iii) Fran Hayes - Banks' or iv) Rob Jackson - Ricoh

3. Write a brief explanation of **one** of the following concepts (50 words). Total marks 10 - all for content.

i) The Haizan Production system
ii) The role of the Marketing Department
iii) Quality circles
iv) Branding

Appendix J (cont). The formal written test used in Chapter 8.

Language work

4. Complete the gaps in the following passage (10 marks). Use one of the words below - not all of them are used.

adapt allow alter at control fulfilment
Having how however I in involved involvement
management managing on production quality circle
quality flow running satisfaction so see why

Interviewer:- I know that Ricoh in its company policy makes a great deal of fulfilment of the job satisfaction that the workforce obtains from playing its part in the production process. How would you evaluate your own job with regard to satisfaction?

Roger:- I think _____ worked for a British company, I worked for Lucas industries for a number of years and I worked abroad for 5 years and came back to UK in 1990 and came to work for Ricoh and I find that probably within the Japanese company we have more _____ and when you have more involvement and some say in the _____ of the company as well then you get greater job satisfaction and I think its safe to say that all people within Ricoh from the staff person to senior _____ gets involved in the daily _____control of the product and I think that's a self fulfilment in itself

Did you find when you came to Ricoh that the the attitude of management with respect to quality took some time to adjust to or was it something that came easily to you ?

Well I was fortunate , I said I worked for Lucas industries and Lucas industries had.. the part of the division I worked for had zero defects we couldn't afford to _____ brakes to get on to a vehicle coming _____ to Ricoh although there some difference it wasn't a great jump for me but yes there were changes there were things that I had to _____ to Japanese ways of doing things questioning more _____ the defect and putting it right first time and these are differences that you find with in a Japanese company that you don't sometimes have in a British company even within Lucas industries but Lucas industries for me was a good training ground _____ I was fortunate

Appendix J (cont). The formal written test used in Chapter 8.

5. Business Vocabulary (10 marks):-

In your own words write a definition of these business concepts:-

after sales service _____

_____

reliability analysis _____

_____

logistics _____

_____

suggestion schemes _____

_____

company secretary _____

_____

rights issue _____

_____

a vertically integrated company _____

_____

market share _____

_____

visitor's card _____

_____

acquisition _____

_____

6. Grammar (10 marks)

Decide if these statements about grammar are True or False - put T or F at the end of the statement.

1 The passive is used when you talk about the person who does an action.
2 Shrenk is the Past Simple of Shrink
3 "so that" can be used to introduce a clause that talks about purpose
4. The following four uses are all possible for the Present Simple tense i) for habits ii) for general truths iii) in commentaries iv) for future timetabled events
5. The following definitions of "any" and "some" are correct. "Any refers to all or none - it is unlimited" "Some refers to a part - it is limited"

Write in the missing grammatical concept (5 marks)

6. _____ can be used for past discontinued habits
7. _____ is the past simple of "strike"
8. _____ is the preposition used to talk about places as surfaces
9. _____ + past participle is used with similar meaning to the passive
10. This time tomorrow I'll be giving my presentation - is an example of _____ tense

Appendix J (cont). The formal written test used in Chapter 8.

7. Functions (10 marks)

Complete the sentences

1. "I wonder if you could possibly ..." is a phrase used for

_____

_____

2. "due to " is used to introduce clauses that

_____

3. "I'm delegated with responsibility for ....." is followed by

_____

4. "In conclusion ...; To conclude ... ; To sum up..." are all phrases that are used to show _____

_____

_____

5. " To put it mildly,... To say the least, .. As/So you can imagine,... Above all,..
Really, ... Without a shadow of a doubt,... Undoubtedly,.." are all phrases that

_____

_____

Decide if these statements about functions are True or False - put T or F at the end of the statement.

6. "Prior to ...." is used before saying what happens next
7. "nevertheless" indicates the following clause supports the preceding one
8. If you are meeting somebody for the first time in a business situation you should use their title, Mr or Mrs and their surname e.g. Mrs Jones, or Mr Williams.
9. The number "thirty two thousand seven hundred and eighty six" spoken in this way is a telephone number.
10. The words "quite, pretty, fairly, somewhat, moderately, relatively" are all submodifiers that reduce the force of adjectives

Appendix K. The assignment evaluation questionnaire used in Chapter 8

BALB 3 - ASSIGNMENT REVIEW - SEMESTER 1

We are currently reviewing the assignment schedule of Semester 1. Your feedback on the 5 assignments will assist us in this review. Just to remind you (!) the assignments were:-

A Interview (1-to-1) Role play (Disciplinary Interview)
B Writing Application (CV and Covering Letter)
C Interview (1-to-1) Role play (Job Interview)
D Summary and reaction to 2 Video Documentaries
E CD-ROM assignment.

For each of the criteria to the left in the list below, rank the assignments in order according to your opinion from the most (= 1) to least (=5). Please compare them with each other and put 1, 2, 3, 4, 5 in the box according to your ideas about the assignments.

For example: if you felt that the assignments got **easier** then your numbering across the top would be 5, 4, 3, 2, 1.

	Assignment Letter (as above)				
	A	**B**	**C**	**D**	**E**
easy					
learnt most new language e.g. vocabulary from					
boring					
relevant to me					
improved my skills (written or spoken) the most					
motivating					
involved most work					
enjoyed the most					
would **NOT** like to do again					

Thanks,
AS-L.

Appendix L. Three of the comprehension task sheets used in Chapter 9.

The comprehension task sheets reproduced here were used in the video and audio delivery. The tasks are the same as those presented in the multimedia application and include the before watching / listening tasks.

1. A Director at Ricoh

Before you watch or listen:-

Roger Hargreaves is going to tell us about his work at Ricoh. He mentions different products, jobs and divisions at Ricoh. Decide which are products, jobs and divisions.

personnel
toner
photocopiers
manufacturing
director
consumables
company secretary
drums

While you watch

Roger Hargreaves is going to tell Terry about his roles at Ricoh.
Watch and decide if these 8 sentences are True or False.

Roger has other functions as well as being company secretary and director.
Japanese company structure is not always simple to understand
He is manager of 50% of Ricoh's manufacturing capability
His approach to managership is personal
The second manufacturing division produces consumables
The optically active photo conducting part of the photocopier is the toner
The photocopiers are classed as hardware
He is responsible for all the hardware.

Appendix L (cont). Three of the comprehension task sheets used in Chapter 9.

The comprehension task sheets reproduced here were used in the video and audio delivery. The tasks are the same as those presented in the multimedia application and include the before watching / listening task.

2. A Quality Assurance Manager

Before you watch or listen

Rob Jackson is a quality manager at Ricoh. He is going to tell us about his work at the company and uses the following phrases. Rearrange the words to make a correct phrase.

a) assistant assurance manager quality
b) reliability long-term analysis
c) system quality management
d) in-line for responsibility
e) service after sales
f) around the table
g) down broken into
h) product batches of
j) basis day day to on a

While you watch

Watch Rob Jackson talk about his position at Ricoh, decide if the seven sentences are true or false.

He has 2 main areas of responsibility
Responsibility for the quality management system includes after sales service and design He analyses the product's reliability over many years
He organises meetings for managers about the quality of products
He makes decisions about the quality of the day's production.
He feels he can protect the customer
The least difficult part of his job is quality acceptance

Appendix L (cont). Three of the comprehension task sheets used in Chapter 9.

The comprehension task sheets reproduced here were used in the video and audio delivery. The tasks are the same as those presented in the multimedia application and include the before watching / listening task.

3. The Purchasing and Logistics manager - his roles.
Before you watch or listen

Chris is going to talk about his responsibility for purchasing, for logistics and for the quality of the parts Ricoh buys. Look at the following phrases and decide if they are about purchasing, logistics or the quality of the parts. Put P, L or Q after the sentences

a) storage of the finished product
b) is a warehousing function
c) are of good quality
d) purchasing of the parts,
e) the storage of the goods
f) and then is shipped out to the customer
g) so that the product at the end of the day is good.
h) movement of all those parts around the factory
i) all the consumables pens, pencils,

While you watch

Chris Nicholls tells Terry about some the areas of his work at Ricoh. Put these phrases in the order that you hear them.

i) covers the storage
ii) but also all the consumables
iii) I do tend to stick my fingers
iv) logistics division manger
v) then is shipped out to the customer
vi) the materials that come into the company
vii) storage of the finished

Appendix M. Three of the cloze passages used in Chapter 9.

1.

Look at the following tapescripts from the two passages that you have just heard. Write the missing words or words that were used in the text in the spaces.

Terry:- Roger Roger Hargreaves you're company secretary and director at Ricoh. But I happen to know that you also have a number of other functions _____ those , could you start off by telling us what those functions are.

Roger:- Within the structure of a Japanese organisation its rather _____ at times the way it operates I also have on a day to day basis general managership of the first manufacturing division that is _____ the manufacturing and also of the _____ division

Terry:- Well as you know we're here particularly to look at the manufacturing process the production process and particularly uh the quality aspects of that so could you tell us a little bit more about the first manufacturing responsibility that you hold here

R.H:- Within the company we have 2 manufacturing divisions which cover all our products the _____ manufacturing division provides the consumable that is the _____ that is the optically active photo conducting part of the photocopier and also the toner that is the ink the places the image on to the paper. The first man .. the second manufacturing division produces all the photocopiers all the _____, so I am in _____ the consumables part of the business.

Appendix M. (cont). Three of the cloze passages used in Chapter 9.

Look at the following tapescripts from the two passages that you have just heard. Write the missing words or words that were used in the text in the spaces.

2.

Terry:- Rob Jackson, you are quality assurance assistant manager here at Ricoh, uh could you start off perhaps by telling us a little about the nature of your job at uh at the company.

R.J. Ok umm I'm responsible to the Managing Director, who you may have met already, Mr Macnamara and umm I'm his management representative umm I'm delegated with _____ main areas of responsibility, Firstly responsibility for the quality management system itself and that uh applies to design right through to _____ umm and secondly a much more in-line responsibility umm related directly to the product itself, umm again that second area of responsibility can be broken down into 2 areas, firstly daily umm quality acceptance for the day's production and secondly _____ reliability analysis

TAG:- Could you perhaps Rob give us some idea of uh your daily routine uh in your role as Quality Manager.

RJ:- the role is extremely varied it's it's and very interesting. I have regular contact with most managers throughout the company obviously with responsibility for the management system it it requires that uh for activities such as internal auditing I get managers around the table to discuss quality matters umm there are lots of occasions where umm sp special quality umm _____ have to be called and it's my job to get everyone to talk about quality, around the table and make sure it gets done uhh that's a general quality management sort of function umm but on a day to day basis there are daily umm decisions that have to be made , decisions about product _____ , whether we release , accept or accept with condition umm batches of product, umm obviously that's quite a high responsibility umm because I'm the last chance the customer has umm to _____ him so those that's perhaps the most _____part of the job I would say.

Appendix M. (cont). Three of the cloze passages used in Chapter 9.

3.

Look at the following tapescripts from the two passages that you have just heard. Write the missing words or words that were used in the text in the spaces.

Terry:- Chris Nicholls you're purchasing and logistics divisional manager here at Ricoh could you tell us a little bit to begin with about what your job entails?

CN:- Yea as the purchasing and _____ division manger I have 3 departments which report to me umm the purchasing department reports so that's uhh department covers all of the purchasing of the parts, not only the parts for Ricoh's production but also all the _____ pens, pencils, basically everything that comes into the company's purchase and that's the responsibility of the purchasing department umm the second area is the logistics department which basically is a a warehousing function and covers the _____ of the goods as they come into the factory movement of all those parts around the factory using various uhh forklift trucks and that sort of equipment and storage of the finished product , once its finished production it goes into the finished goods warehouse and then is _____ out to the customer that's the responsibility of that area and the third area is the responsibility for the quality of all of the parts and the _____ that come into the company so that we have to guarantee that the parts that we're purchasing when they get to our production line are of good quality so that the product at the end of the day is good.
Terry:- So you're in a position to have really a very good overall view of the nature of the company and its functioning
Chris:-Yes as a divisional manager level uhh I know that I m responsible for for the that division but I do have a more an overview and I do tend to _____my fingers in other people's pies right across the company from the from where I sit.

Appendix N An example of four subjects' writing from Chapter 10.

Four examples of subjects' written recalls from the video (V) only group. All are reproduced exactly as written.

1. The topic is job satisfaction and fulfilment
Joe has previously worked for British compnaies and have found them good practise for working in a Japanese company
It took a little adjustment but wasn't too great a jump for him to get to work for Ricoh
He finds the involvement in the quality procedure and in the company as a whole very satisfying and is especially happy with the why the fault and get it right first time policies.

2. It was about work satisfaction.
One employee of Ricoh compared a British company with Ricoh which is a Japanese company.
In Japanese companies there's more involvement and that increases the work satisfaction.
He was used to working for Ricoh very quickly since the British company had a similar approach to quality.

3. Terry asks the other man if he had problems adjusting to the way Ricoh's management handles quality.
Before this he asks him something about job satisfaction.
The other person said that he thinks job satisfaction has a lot to do with involvement .
He thinks that the Japanese companies have employees who are more involved with the work they do.

4. The old man used to work in a British company and is now working for Ricco Japanese comapny.
He says that he likes to work for them because they're more open-minded
Everyone can give his opinion and is involved with production control.
He used to work for five years abroad.
He likes to work for Rico.
So his job satisfaction is high.

Appendix N (cont) An example of four subjects' writing from Chapter 10.

Four examples of subjects' written recalls from the video and subtitles (VS) group. All are reproduced exactly as written.

1. it's about a person who was working in Lucas industries and then he changed to Ricoh and he made the difference between the two companies because in Ricoh I think there is more involvement so you have more job satisfaction and then the Japanese company they had to work with zero defects so nothing could go wrong.
When he arrived in ricoh he started he asked why people asked so many questions about when things should be done and something but he thought that working in Lucas industries was a very good way experience for him

2.He says that job satisfaction merely is about personnel feeling involved in the company.
and he means everybody from a staff person to a senior manager.
this is something that many Japanese companies use in thier management
It's all about group work discussing problems as well as new ideas
The more people feel involved in what they do the better results you can acieve

3. The interview deals with a person working for Ricoh a Japanese company with a plant in England.
The subject is the fulfilment of the job satisfaction.
In the opinion of the person interviewed in a Japanese company the people get more involved with their jobs from the staff to the direct manager
It's in the way the Japanese do things putting more attention into the mistakes.

4. He worked for Lucas industries and abroad for five years.
he's really satisfied of his job and the self-fulfilment is taken in great account in Ricoh's.
But everyone there is highly involved in the quality of the product.
There are some things that he had to adapt to.

Appendix N (cont) An example of four subjects' writing from Chapter 10.

Four examples of subjects' written recalls from the tasks and video (VT) group. All are reproduced exactly as written.

1. Jo talks about the job satisfaction he got from the company Ricoh.
he said Japanese companies are much more concerned with personal involvement which motivates workers and fulfills their satisfaction
They also ask questions which enhances the product quality
There is not so many changes with British companies.

2. In this interview the interviewer wants to know about Joe job if he satisfied or not in his job at Ricoh.
Ricoh's company is known to take into account its employees' satisfaction and the interviewer wants to know if it's true or not with this employee Joe.
Joe used to work a lot abroad particularly in Japan where he thinks there is a lot of involvement and that means more satisfaction
But now at Ricoh's it's not the same because employees only take into consideration daily quality control.

3. The interviewer wants to know Joe's opinion about his work satisfaction at his job Recoh.
First Joe explains that he worked abroad before and he has some foreign job experiences that is why he can compare his first job experiences abroad with his job at Recoh's factory.
Joe thinks that Japanese work demanded more involvement from the workers and because he got more involved with his job he seemed to get more job satisfaction at his job abroad than with Recoh's
However he is quiet satisfied and adapted to his job environment at Ricoh's now.

4. The first character he asked the other one how he would evaluate the other one.
The second said he worked for 5 years abroad and he worked for a British company with quite the same policy. He thinks people have more involvement in Japanese company
It wasn't a great jump for him because n the british company they can't afford to allow ...

Appendix N (cont) An example of four subjects' writing from Chapter 10.

Four examples of subjects' written recalls from the video, tasks and subtitles (VTS) group. All are reproduced exactly as written.

1. Joe is currently working for Richon which is a Japan origined multinational company.
He previously worked for Lucas industries and moved to Richon in 1990.
He thinks that there is more involvement in Japanese company when compared to his previous job experiences.
In Richon from staff person to the senior management everybody is involved in the daily quality control of the products.
In Richon when a problem is being found they go for it to try to find out what it is.

2.Joe has been working for Rico since 1990.
Before working here he worked abroad and before that he worked for another company a european one Thomas
Joe is very happy to work for Rico.
He likes his work and is very motivated.
He thinks working for a Japanese company is different from working for a european company because everyone in a Japanese company is more involved from the top of the company to the bottom.

3. The interviewer asked Joes whose function I can not remember what he thinks about the company policy about fulfillment, job satisfaction and so on
Joe answered that he had worked abroad (in Japan) for five years and that there they were more committed.

4. In the video is an enterview between a report and a employ. The report ask to employ i) when arrived at the new his act??? company was funny
The employ answer that he had worked in Japanis's companies and too in Brithish's companys and now in this company. He said that in Japanish company the managers don't allowed made mistakes and in that company el perecnt of mistakes was 10 percent.
The employ too said that now he was very affortunate for known others companys but that he is confortable.

Appendix 0. Copies of Refereed Academic Publications which have been derived from this thesis.

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A COMPARATIVE STUDY OF THE EFFECTS OF THE USE OF MULTIMEDIA ON LISTENING COMPREHENSION[1]

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Listening is a key second language skill, it has a vital role in the language acquisition process, and its development is of prime concern to language teachers. Computer software applications to further language learning are becoming commonplace and with advances in technology are now able to include multimedia that delivers video and audio in combination with text. This study investigates listening performance in a computer-based multimedia environment. It compares learner success rates on comprehension and language recall tasks while using the three different media of audio, video and multimedia. Results of performance on tasks showed more effective comprehension and recall while using multimedia than either audio or video plus pen and paper. A learner questionnaire indicated possible reasons for the greater success of multimedia. Implications of these results for the use of multimedia for listening comprehension are then discussed. Among these are that multimedia-delivered listening comprehension tasks may be more efficient and that ongoing feedback to tasks should improve comprehension. © 1997 Elsevier Science Ltd. All rights reserved

This study is concerned with the effectiveness of computer-based multimedia for developing listening comprehension in English as a Foreign Language (EFL). The listening skill plays a significant role in communication and in language learning (Rubin, 1994; Dunkel, 1991; Rost, 1990; Anderson and Lynch, 1988) and is perhaps "the most fundamental language skill" (Oxford, 1993: p. 205). Although there is no agreed definition of the listening skill (Wolvin and Coakley, 1988) nor a complete understanding of all the processes involved in listening (Rubin, 1994; Buck, 1992), the development of the listening skill has always been of prime concern to language teachers. Listening assumes increased importance as not only is it a key language and communication skill in its own right, but it also provides a channel through which new language can be received and may become "intake". Many language learners experience and report difficulty with this skill (Underwood, 1990: p. 16). Traditionally, classroom or language laboratory-based listening work has used audio cassettes or video cassettes accompanied by varieties of tasks as

reflected in supplementary skills titles such as Elementary Task Listening (Stokes, 1984), What a Story (Underwood, 1976) and Television English (Willis, 1986). In brief, these materials aim to develop listening skills by providing authentic listening/viewing texts that are accompanied by motivating, focusing, and achievable tasks. The tasks serve to direct listeners to relevant aspects of meaning in the texts.

Recent advances in computer technology now allow the delivery of digital video and audio in the same interface as written text. Such potential has been adapted to the purposes of listening skills development on EFL CD-ROMs. These provide listening tasks, language input and feedback on task success all via the computer screen. Although such multimedia applications are being developed, marketed and used both in classes and in self-access centres, there has been little empirical research into their effectiveness.

The aim of this investigation was to try to assess if a computer-based multimedia application for listening comprehension was an effective tool. It compared learner success on listening comprehension tasks and language recall tasks completed while using the two different media of audio cassettes or video cassettes plus pen and paper, with that achieved while using multimedia. This paper will first discuss the development of the listening skill and the application and evaluation of computers in language learning. Secondly, the research methods are described and then the quantitative results showing significantly higher comprehension success rates, language recall and learner preferences for multimedia are put forward. The discussion section seeks to explain these findings in terms of efficiency gains and the effect of ongoing feedback. The implications of the results with regard to language laboratories, the creation of multimedia products, computer task types and to second language acquisition are outlined.

BACKGROUND AND PURPOSE OF THE STUDY

This section outlines the background to this study. It reviews the current approach to developing listening skills and some of the evaluative studies undertaken to assess the effectiveness of computer applications for language learning. The aims and hypotheses of the study are then described.

Developing listening skills

The current pedagogic approach to the development of the listening skill (e.g. Underwood, 1990; Rost, 1990; Anderson and Lynch, 1988) holds that learners are presented with interesting relevant, authentic spoken language input via an audio cassette, video or directly from the teacher. This input needs to be accompanied by achievable tasks or activities that focus the listeners' attention on the messages in the texts. The tasks aim to guide and support the search for meaning. The tasks should be enjoyable and involve an outcome. Underwood (1990) lists a spectrum of while-listening task types. In classroom or self-study use these tasks are often provided on paper and answered by pen. Feedback on performance is also important to inform learners about their relative success or failure and usually provided on completion of the tasks. Borrowing from schema theory (Carrell *et al.*, 1988), provision of pre-listening tasks is seen as beneficial in building up prior

is likely to be challenging, given the "multi" nature of these learning resources and the large variety of the learner-controlled combinations of input, tasks and reference material that such resources provide. However, formal studies of interactive video (Watts, 1989) suggest learning gains in translation, pronunciation and comprehension. An investigation of the effects of subtitled multimedia (Borrás and Lafayette, 1994) reported increases in performance on oral communicative practice tasks. Studies of motivation and the use of multimedia or interactive video have demonstrated positive effects (Brett, 1996; Watts, 1989). In terms of listening comprehension, Grezel and Sciarone (1994) report that the "monitoring of listening comprehension development by daily testing with computers promotes second language proficiency" (p. 125). Although the majority of evaluations of the many aspects of CALL do indicate learning gains, as Higgins (1995) rightly notes, evaluation of CALL is not without difficulties and ultimately needs to be able to correlate "success in the learning activity with success in real life" (p. 76).

Aims of the study

The aim of the study was to gain some initial quantitative data on the question Nyns (1989) posted as "Which medium is best suited to teach such-and-such a skill?" (p. 44). This seems especially worth asking in the case of multimedia applications which are expensive and time-consuming to develop. There were three specific aims of this investigation. The first was to compare multimedia-delivered listening comprehension tasks with the traditional pedagogic tools of audio cassette or video accompanied by written tasks. Would learners of equal ability following the same pedagogic sequences and using the same input material but working with audio, video or multimedia perform differently on the same comprehension tasks? A second aim was to compare the language recall abilities of learners who had completed language tasks using these three different media. Finally, the study aimed to try to explain any differentials that were found in learner success rates among the three media.

The hypotheses

The four specific hypotheses examined were that:

(1) learner success rates with comprehension tasks would be greater while using multimedia than audio or video plus pen and paper;
(2) the greater success on multimedia-delivered comprehension tasks would coincide with better language recall;
(3) the greater success rate would be attributable to the unique features of multimedia, i.e.:
    (a) the ongoing feedback provided by the multimedia in the form of instant ticks and crosses would act to guide, confirm and realign learners' internal and ongoing reconstruction of the message; and
    (b) efficiency and focus would result from the use of the one interface which allows display of tasks, response to tasks, feedback and language input (digital video); and

(4) learners would regard use of multimedia for listening comprehension as positive, effective and motivating.

knowledge and expectations of the texts' contents, as well as for exciting linguistic knowledge. The further use or analysis of the language or content of listening material in post-listening tasks is also viewed as desirable (Underwood, 1990: pp. 74–78). The application used in this investigation translates such pedagogic rationale and procedures into a multimedia format and has been described in detail elsewhere (Brett, 1995).

The listening skill is also seen as playing a central part in the acquisition of new language and has been a cornerstone of many theories of second language acquisition (e.g. Krashen, 1985; Long, 1985). Briefly, these theories assume that exposure to authentic listening and reading texts facilitates an implicit process through which new language and linguistic rules become internalised and can then be automatically reproduced. A particular role in such acquisition theories is ascribed to "comprehensible input" and to the mechanisms by which such input is modified and made comprehensible to the learner. The role of negotiated interaction (see Chaudron, 1988 for a review) is seen as especially helpful.

Evaluating computer assisted language learning

Computer technology has been applied to further the cause of language learning in a variety of creative ways. CALL practitioners have diligently engaged in the evaluation of the learning potential of such software and the language activities it generates. Examples of such evaluative inve tigations are Legenhausen and Wolff's (Legenhausen and Wolff, 1990) study of the use of Storyboard, a total cloze application, and of Granville, a computer-based simulation. They found useful potential in the former but little in the later. Likewise, the work of Piper (1986) and Jones (1986, 1991) focusing on the language and interaction generated by computer simulations reports minimal language use and interaction. However, Cheung and Harrison (1992) investigated the potential of an adventure game finding positive learning gains in program-specific lexis. Johns (1991) found that learners using concordancers can acquire linguistic knowledge and also develop their learning processes by taking the role of the "linguistic researcher" (p. 2). Several studies of CALL programs for vocabulary development have also reported positive results (see Goodfellow, 1995, for a review). The ability of the computer to deliver feedback has been shown to have beneficial effects on learning (e.g. Nagata, 1993), as has the use of word processors on writing skills (e.g. Piper, 1987; Pennington and Brock, 1992) and the use of electronic glossaries (Leffa, 1993).

Multimedia, the development of listening comprehension and evaluative studies

One of the latest developments now allowed by advances in the power, speed and capacity of computers is the ability to provide applications that are designed to facilitate the development of learners' listening skills. Such applications allow the juxtaposition of audio or video input with listening tasks in the same computer interface. Immediate or delayed feedback on learner success with tasks is also provided. Examples of such multimedia applications are "Getting the Message" (1992), "Multilevel Business English Programme" (1995) and "English for Business 2—Managing Quality" (1995).

There have been few investigations of computer applications for listening skills or of the effects of multimedia applications. Indeed, the study of the use of multimedia applications

was designed to gain information about the effect of instant feedback, efficiency, ways of responding and attitudes to the use of multimedia.

Procedures

Data was collected from the learners during class contact time, the audio and video comprehension responses during one session and the multimedia material during a later computer laboratory session. It had been planned to use a video laboratory where each student had headphones and an individual TV for the video material—but the lab caught fire on the day the research began and so one TV per class group was used! Each class group completed two different audio-delivered comprehensions, two different video-based comprehensions and two different multimedia-delivered comprehensions. Each class undertook each of the six comprehension texts, two via each of the three media.

The same procedures and the same learning tasks were used for each of the three media. Learners were first given a pre-listening task and feedback on it. The pre-watching tasks in the multimedia sessions were completed on-screen. The comprehension tasks were completed on paper for audio and video modes. Learners were given only one listen/watch for the while-watching/listening tasks. The multimedia tasks (pre- and while-watching) were completed on computer screen by clicking on a mouse (texts 1, 2, 3, 5 and 6) and by using a drag and drop exercise (text 4). Only one continuous play of the digital video was allowed for task completion. There were two differences in the multimedia delivery. The learners received instant evaluative feedback to their responses. This was in the form of a tick or a cross (see the interface in Appendix C). Also, the tasks that consisted of true/false statements appeared in sequence one at a time on the screen. A further statement appeared only after a response had been given to the on-screen statement. The CD-ROM also affords its users various other avenues of assistance such as on-line definitions, subtitles to the text and the control of the digital video. None of these facilities were used during the comprehension tasks so as to maintain equal input conditions with the audio and video sessions. The learner responses were then collected and collated.

On completion of each comprehension task learners were given the cloze passage and asked to complete the gaps with the exact word or words missing from the texts. As a follow-up to the controlled conditions imposed for the research at the start of the multimedia session, learners were then allowed to explore the CD and were let loose on its full range of features, namely the language awareness tasks, control of the video, the written subtitles, the glossary, and the different levels of comprehension tasks. At the end of this learner-controlled session of about 30 min the questionnaire (Table 4) was completed.

RESULTS

This section puts forward the results of the three sets of data collected during the study, the comprehension task success rates, the language recall success rates and the questionnaire on multimedia.

METHODS

This section describes the methods used in the study. There were three different sets of data collected. The first consisted of learner responses to listening comprehension tasks, the second a set of cloze tests asking learners to recall the exact language used in the listening texts, and the third learner responses to a questionnaire about the use of multimedia for listening.

Subjects

The learners in the study were all final year undergraduates on a business and languages degree at the University of Wolverhampton. They were all Europeans, French, German or Spanish. Forty-nine learners completed two of each of the audio and video comprehension and language recall tasks, and 43 of these learners completed two of each of the multimedia comprehension and language recall tasks. There were individual variations in language ability, but all subjects could be characterised as advanced learners of English. All were fairly familiar with the use of computers, having had to produce word-processed assignments. Most had used a similar multimedia language learning CD-ROM in their classes.

Materials

Listening texts. The following materials were used in this study. Six different video-based listening texts each between 1.5 and 2 min long were selected from the CD-ROM "English for Business 2 Managing Quality". These consisted of native speaker businessmen talking about various aspects of their work. Each of the six was used in each of the three media, on an audio cassette, a video cassette or via CD-ROM. The video cassettes used the same video as the CD-ROM. The multimedia interface is shown in Appendix C.

Worksheets. Paper-based worksheets were prepared to accompany each of these six texts when delivered by audio or video. These contained written pre-watching tasks and the while-watching tasks. For the multimedia delivery the pre-watching tasks and while-watching tasks were delivered and completed on-screen.

Listening task types. Five of the while-watching comprehension tasks were true/false statements and one, text 4, was a "put these in the same order that you hear them". The written instructions for each of the texts were the same in each of the three media. An example is shown in Appendix A.

Cloze tests. Cloze passages for each of the six texts were prepared. The deletions were made at the key points in the texts which contained the information and lexis relevant to the comprehension tasks. An example of a cloze passage is shown in Appendix B.

Questionnaire. This was prepared in order to try to explain any different results in learner success rates with the three different media. It used a 5-point Likert scale and is shown in Table 4. The 10 questions were related to the hypotheses of the investigation and probed learners' reactions to specific features of multimedia-delivered listening work. It

T-tests were calculated to compare the means of the multimedia scores with those of the audio and video to see if the differences were significant at $p < 0.05$. They proved to be so in four cases. The differences were approaching significance in three or more instances. These figures support Hypothesis 1.

Table 2 shows the data collected from the language recall exercise. This was a difficult task with low overall success rates, as might be expected with learners allowed only one listen/watch of each text. However, the accurate reconstruction of the exact missing words can only have been the result of the language input. Results indicate that multimedia seemed to facilitate better recall in four of the texts (1, 2, 3, 5) and very slightly better recall in number 6. In text 4 multimedia yielded the lowest success rate of the three modes. *t*-test scores were calculated to compare the means of multimedia recall with either audio or video. These showed significant differences between multimedia and audio in texts 1, 2 and 5 and significant differences between multimedia and video in texts 1 and 2. These figures support Hypothesis 2.

Questions 1, 2, 3, 4 and 7 in Table 3 were designed to elicit learner reactions to the features of multimedia that might encourage more successful listening. Questions 1, 3 and 4

Table 3. Questions and percentage of learner responses to the questionnaire that followed up the multimedia session

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. Seeing only one question at a time on the computer helps to focus my listening.	27.9	67.4	2.3	2.3	0
2. The instant feedback to my answers (the ticks and crosses) *does not* help me to understand while I am listening.	7.3	26.8	31.7	29.2	4.87
3. It is easier to respond to the questions using a mouse than pen and paper.	35.7	42.8	19.07	2.3	0
4. Having the questions, the language input and the area to put my answers all in one place (the computer screen) *does not* make listening comprehension easier.	4.5	11.3	15.9	52.27	15.9
5. It is easier to remember language used on multimedia than TV or audio.	7.1	30.9	33.3	25.5	2.3
6. I think I will learn more English using audio cassettes than by using multimedia.	0	4.6	20.9	60.46	13.9
7. When my answers were wrong it helped me to understand the listening texts.	2.3	58.1	13.9	25.5	0
	Audio	MM	Video	Same	
8. Using which of these media most helps you understand the texts? Please circle one.	7.1	61.9	19.04	11.9	
9. Which media do you prefer using for listening? Please circle one.	19.5	41.46	31.7	7.3	
10. Which media do you think helps you learn most new language?	12.19	70.73	12.19	4.87	

Table 1. Sample sizes, means, standard deviations, and *t*-test scores (*$p < 0.05$) of the six comprehension texts according to the delivery method

Text no.	Delivery method	*N*	Max. score	Mean	Mean percent	SD	*t*
1	Audio	12	8	4.17	52.08	2.21	2.268*
1	Video	12	8	3.25	40.63	1.82	4.581*
1	Multimedia	28	8	5.75	71.88	1.38	
2	Audio	12	7	4.25	60.71	1.36	0.417
2	Video	13	7	4.00	57.14	1.96	1.314†
2	Multimedia	17	7	4.53	64.71	2.24	
3	Audio	20	6	3.15	52.50	1.63	2.901*
3	Video	12	6	3.75	62.50	1.29	1.612†
3	Multimedia	12	6	4.42	73.61	0.79	
4	Audio	20	5	3.25	65.00	1.52	−1.172
4	Video	12	5	3.33	66.67	1.67	1.050
4	Multimedia	12	5	2.42	48.39	1.16	
5	Audio	22	8	3.59	44.89	2.15	2.303*
5	Video	20	8	5.10	63.75	1.21	0.458
5	Multimedia	11	8	5.27	65.91	0.65	
6	Audio	12	6	2.08	32.72	1.68	1.432†
6	Video	29	6	3.03	50.57	1.06	−0.173
6	Multimedia	11	6	3.00	48.50	1.14	

†Differences approaching significance.

Table 2. Sample sizes, means, standard deviations, and *t*-test scores (*$p < 0.05$) on cloze tests for language recall for each of the six texts according to delivery method

Text no.	Delivery method	*N*	Max. score	Mean	Mean percent	SD	*t*
1	Audio	12	8	1.75	21.88	1.54	2.392*
1	Video	12	8	1.50	18.75	0.67	3.044*
1	Multimedia	28	8	3.89	48.66	2.73	
2	Audio	12	7	1.67	23.81	1.07	3.339*
2	Video	13	7	0.77	10.99	0.83	1.835*
2	Multimedia	17	7	2.94	42.02	2.22	
3	Audio	20	6	3.15	52.50	1.63	−2.295
3	Video	12	6	3.75	62.50	1.29	−1.944
3	Multimedia	12	6	4.42	73.61	0.79	—
4	Audio	20	4	1.60	40.00	1.13	−0.921
4	Video	12	4	1.92	47.92	1.47	−1.606
4	Multimedia	12	4	1.17	29.17	1.22	—
5	Audio	22	8	1.05	13.07	1.13	3.856*
5	Video	20	8	3.05	38.13	1.47	−0.363
5	Multimedia	11	8	2.91	36.36	1.22	—
6	Audio	12	6	1.83	30.56	1.03	0.620
6	Video	29	6	2.14	35.63	1.22	−0.182
6	Multimedia	11	6	2.18	36.36	0.98	—

Table 1 shows the data collected from the comprehension tasks. Multimedia comprehension tasks show average success rates above both video and audio in four of the texts (1, 2, 3, and 5). In text six the multimedia mean is slightly less than that of the video but in text 4 is notably lower than both audio and video. An explanation for this is given later.

Table 4 shows the responses to the open-ended parts of questions 8, 9 and 10 when learners chose "multimedia" from the four options. The responses clearly show that the features of multimedia which might be supposed to facilitate comprehension and learning are valued by learners. Learners completed these after they had been given the freedom to use all the interactive features. For example, the "combinations of elements" was picked out in all questions and the dimension of "focus" featured consistently in question 9.

LIMITATIONS OF THE STUDY

Although the data shows support for the effectiveness of multimedia, mention should be made of some of the limitations of this study. The sample size is not necessarily large and is made up of learners who are motivated and "academic" English language undergraduates. They were already "computer literate". No test of listening skills or language proficiency was undertaken to verify the homogeneity of the learners. The communicative listening purposes were all "transactional" involving transfer of information. The study is a "snapshot" and a longitudinal study involving repeated uses of multimedia across a large variety of text types may produce different results. If the assumptions are correct and both the gains in efficiency and the ongoing feedback do positively affect comprehension, no attempt has been made to separate the effects of each.

DISCUSSION

This section puts forward some possible explanations for the greater success rates of multimedia. It first discusses the efficiency of the multimedia environment, then the role of the feedback and its impact on comprehension, and finally relates these comprehension gains to possible language acquisition.

Multimedia and efficiency of focus

There may be certain gains in efficiency of the use of a computer interface for all of the components of listening tasks. Responses to question 4 seem to indicate that learners feel that such an amalgamation helps make listening easier. It was certainly noticeable during the video plus pen and paper tasks that over half of the learners in each class never watched the video but only looked at the written true/false statements on their task papers. While completing the on-line comprehension tasks, only slight eye adjustments between video image and true/false statements are needed. Using a mouse click to respond is a briefer action than writing "T", "F" or a number on paper and may free up attention capacity that can then be used for listening. An explanation for the less successful performance on text 4 may be that the drag and drop exercise type was not as easy to complete and it diverted attention from the listening text. This is an interesting find for multimedia developers. It also indirectly supports the idea that complicated task completion (drag and drop or pen and paper) may interfere with the listening process. The arrangement for the true/false statements in this application was such that only one of the six, seven or eight statements per listening text was on-screen at one time. This seemed to help to focus learners' attention on listening only for that specific element of the message.

Table 4. Learner responses to the question "why" when they chose multimedia, following questions 8, 9 and 10

Feature of multimedia described	No. of mentions	Examples of written learner responses
Question 8		
Combinations of the learning features	10	I have all in one audio, video and the exercises because I've got the texts and the answers in front of me on the screen
Pictures	5	When I can see the expressions of the people I understand it better
Computer	3	Because I prefer using the computer
Interactivity	2	Because I can participate
Ease of use	1	Easier usage
Question 9		
Focus	9	I put in my answers and watch the video together It helps you because it has the questions asked at each time
Combinations of the learning features	6	You can use the subtitles and the images Possibly to stop and replay and answer again
Ease	2	Don't need anything else but the computer
Question 10		
Combination of the learning features	22	Listening, reading, writing at the same time You have everything in here (listening writing) Easier to give your answers when you hear the words on the screen
Choice	3	You can do it at your own pace
Computers	2	Prefer working on PCs than video audio

relate to the efficiency of multimedia that has everything (video picture, aural input, written tasks, and the place for response and feedback) in the same place. Learners seemed to appreciate such efficiency. Two questions (2 and 7) were included to probe reactions to the instant ongoing feedback. The responses to question 7 indicate that this may be helpful, but the responses to question 2 are not as positive. Questions 5 and 6 asked about learning and remembering from multimedia. No clear favourite emerged for remembering, but multimedia seemed preferable to audio cassettes for learning. The last three questions asked learners to compare the three media as to their contribution to understanding (question 8), to preference for listening (question 9) and to learning (question 10). Multimedia was strongly favoured for understanding and learning and slightly favoured for listening. The responses to questions 5, 6, 8, 9, and 10 support Hypothesis 4.

There is some evidence in these responses to support Hypotheses 3(i) and 3(ii), which aimed to try to explain any greater success found in the use of multimedia. Hypothesis 3(i) proposed that the instant feedback in the form of instant ticks and crosses would act to guide, confirm and realign learners' internal and ongoing reconstruction of the message. This is supported by the responses to question 7 but perhaps not so by responses to question 2. Hypothesis 3(ii), that the use of the one interface helps in listening comprehension, is supported by the responses to question 1, 3 and 4.

Second, it would appear from the results that more effective development of listening skills may be facilitated using multimedia technology than our traditional tools of the audio cassette player, language laboratory, and video cassettes combined with pen and paper. These gains suggest that investment in language laboratories may be less beneficial than that in multimedia computers. Ironically, it would also appear that we have a self-study listening resource which achieves better results than its teacher-led counterpart!

Third, there is an implication for the nature of the task types that accompany on-line listening texts. Text 4 asked learners to put a list of topics into the order in which they were mentioned and on the computer this meant a "drag and drop" method of response. The task was completed much less successfully on multimedia. It appears that such tasks were new, not understood, or more complicated than those in the other texts. Obviously, application developers need to make certain that they are not hindering the comprehension process when they design comprehension tasks.

Fourth, these gains in comprehension would most probably increase dramatically if the study had unleashed learners and let them exploit all the learning resources contained in this multimedia application. Doughty (1991) provides the rationale for multimedia within a Negotiated Interaction Model of Second Language Acquisition. She has pointed out that such interactive facilities in multimedia applications and under learner control serve to replicate features of real-life negotiated interaction, namely "requesting clarification, confirming understanding, and checking for comprehension" (p. 12).

Finally, it may be that such studies as these need to be incorporated in the development procedures for multimedia language learning products where appropriate in order to gauge if the multimedia provision is providing any added value.

SUMMARY

This paper discussed the listening skill in language learning, the pedagogic approach to the development of the listening skill and the application of computer technology to the listening skill. The methods used to investigate comparative success rates on comprehension tasks and language recall through use of audio, video and multimedia were then described. The quantitative results showing higher success rates for tasks completed on multimedia were then shown. Finally, some of the implications of these results for the development of listening skills, for possible acquisition of new language and for the use of multimedia applications in language learning were put forward. It is of course a matter for further research to confirm such findings in other learning contexts and, much more importantly, to confirm that such benefits and gains within a pedagogic context may be transferred to real-life performance.

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Feedback and the monitoring of comprehension

A further reason for the greater success rate on the multimedia comprehension tasks may be the feedback. Learners received instant ticks or crosses for their responses to all the parts of the tasks. It is suggested (Oxford, 1993; O'Malley *et al.*, 1989; Buck, 1991) that L2 listening involves the constant monitoring of the state of one's comprehension by the listener, and indeed O'Malley *et al.* (1989) suggest that this is a key strategy used by effective listeners. While listening to extended transactional discourse listeners need to constantly monitor their progressive and unfolding interpretation of the text, matching the new input with what has already been interpreted. This application's instant confirmation or rejection of the learner's ongoing interpretation of the meanings may serve to support the listening process. It provides such an ongoing monitoring facility by confirming or rejecting learners' updated interpretations. If wrong interpretations have been made, then learners are made aware of these during the listening. They can then proceed to interpret the following language input from a position of understanding rather than carrying forward flawed interpretations to the next part of the discourse. The feedback has probably helped learners to notice that their developing interpretations were inaccurate and averted serious comprehension breakdowns or has confirmed that interpretations were accurate. However, whether the provision of an ongoing monitor via multimedia will encourage the development of such self-monitoring strategies in real situations is another issue.

Multimedia, comprehensibility, language recall and language acquisition

The results of this study indicate that higher levels of comprehension and language recall were achieved while listening in the multimedia environment. Any explanation of the greater success in the cloze tests and thus of language recall of learners using multimedia as seen in Table 2 is going to be somewhat speculative. It is supposed that for language acquisition to occur learners need to be exposed to input that has been made comprehensible (e.g. Krashen, 1985; Long, 1985). It may be that the instant feedback which funnels learners into an ongoing accurate interpretation of the main communicative elements of the listening texts has the effect of making such input comprehensible. While also confirming or clarifying learners' representations of the texts, it might be that the comprehension tasks and the feedback to them combined to focus attention on the specific linguistic features that carried and signalled such meanings. As indicated earlier, the items selected for deletion in the cloze passages were central to the interpretations necessary for the true false tasks. Tentatively then, it may be that using such multimedia activities affords higher rates of comprehension through the provision of instant feedback and also through the efficiency gains of such an environment. Therefore, exposure to language input that has been made comprehensible in this way might serve to encourage language recall and subsequent acquisition.

Implications

There are several implications of these results. First, it would appear that the investment in and development of multimedia software applications for listening do achieve a payoff in terms of quantifiable learner success rates and learner-perceived learning gains. The implication is that there is evidence to support the development of more applications. Further research is necessary on exactly how the various pedagogic elements in multimedia provision, e.g. text types, task types, feedback types and learner types, impact on success rates.

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APPENDIX A

An example comprehension task (text 1) used in the data collection
Roger Hargreaves is going to tell Terry about his roles at Ricoh. Watch and decide if these eight sentences are true or false.

1. Roger has other functions as well as being company secretary and director.
2. Japanese company structure is not always simple to understand.
3. He is manager of 50% of Ricoh's manufacturing capability.
4. His approach to managership is personal.
5. The second manufacturing division produces consumables.
6. The optically active photo conducting part of the photocopier is the toner.
7. The photocopiers are classed as hardware.
8. He is responsible for all the hardware.

APPENDIX B

An example of the language recall cloze (text 1)
Look at the following tapescript from the passage that you have just heard/watched. Write the exact missing words or words that were used in the text in the spaces.

Terry: Roger, Roger Hargreaves you're company secretary and director at Ricoh. But I happen to know that you also have a number of other functions _____1_____ those could you start off by telling us what those functions are?

Roger: Within the structure of a Japanese organisation it's rather _____2_____ at times the way it operates. I also have on a day to day basis general managership of the first manufacturing division that is _____3____ the manufacturing and also of the _____4_____ division.

Terry: Well as you know we're here particularly to look at the manufacturing process, the production process and particularly, uh, the quality aspects of that so could you tell us a little bit more about the first manufacturing responsibility that you hold here?

Roger: Within the company we have two manufacturing divisions which cover all our products the __5_____ manufacturing division provides the consumable, that is, the ___6_____ that is, the optically active photo conducting part of the photocopier and also the toner, that is, the ink that places the image on to the paper. The first man... the second manufacturing division produces all the photocopiers all the _____7_____, so I am in _____8_____ the consumables part of the business.

Answers were: 1. apart from 2. complex 3. half 4. personnel 5. first 6. toner 7. hardware 8. charge of

NOTE

[1]This paper is based on a talk first presented at IATEFL conference held at Keele University, April 1996.

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APPENDIX C

The multimedia interface used in the study (although not depicting any of the tasks in the study)